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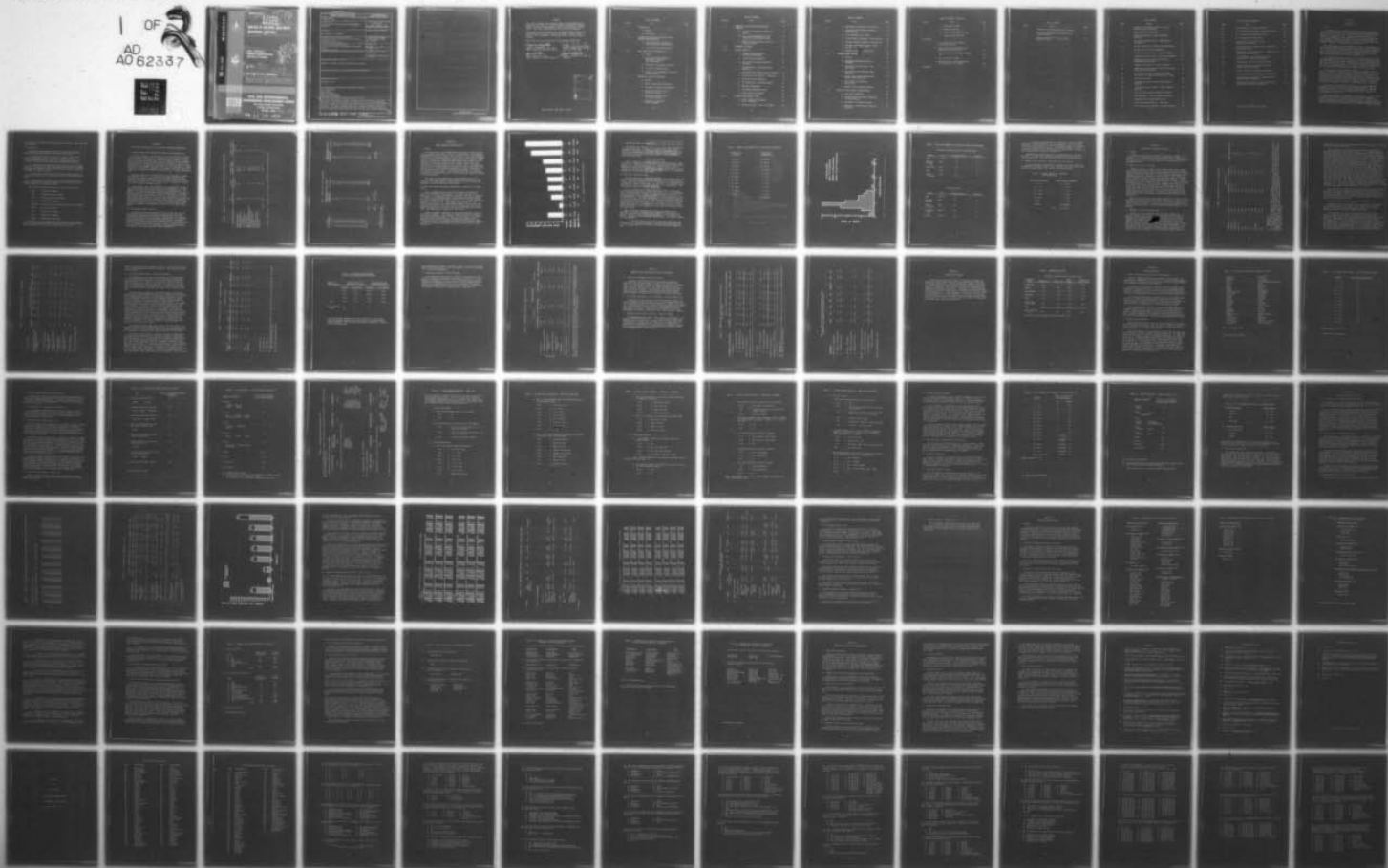
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ANALYSIS OF AIR FORCE SOLID WASTE MANAGEMENT PRACTICES.(U)
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**ANALYSIS OF AIR FORCE SOLID WASTE
MANAGEMENT PRACTICES.**

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ROBERT F. OLFFENBUTTEL

**RESOURCES CONSERVATION BRANCH
DIRECTORATE OF ENVIRONICS**

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**CIVIL AND ENVIRONMENTAL
ENGINEERING DEVELOPMENT OFFICE**

(AIR FORCE SYSTEMS COMMAND)

TYNDALL AIR FORCE BASE

FLORIDA 32403 393 250

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PREFACE

This report documents work performed during the period May 1975 to February 1978 by the Civil and Environmental Engineering Development Office, Air Force Systems Command, Tyndall Air Force Base, Florida 32403. Capt Robert Olfenbuttel was the principal investigator.

This report has been reviewed by the Information Office (OI) and is releasable to the National Technical Information Service (NTIS). At NTIS it will be available to the general public, including foreign nations.

This report has been reviewed and is approved for publication.

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SECTION I

INTRODUCTION

A. General

In December 1976, 173 Air Force installations were instructed to complete a questionnaire on their Fiscal Year 76 solid waste management practices, as part of the Air Force's annual Environmental Status Report, RCS: DD-H&E (A) 1269. The purpose of the survey was to establish a comprehensive data baseline from which the Air Force can make reasonable decisions on how best to meet the growing number of governmental solid waste directives. The survey concentrated on residential, commercial, and institutional solid wastes.

The installations surveyed included all those in the Continental United States (CONUS), Alaska, Canada, Hawaii, Guam, and the Panama Canal Zone. Thirteen installations did not respond because they either deactivated during the year or had their responses included with that of other installations that managed the solid waste function for both. (The survey questionnaire is included as Appendix A.)

The questionnaire was designed to cover as many solid waste management arrangements as possible. However, some of the responses received indicated that there are unique situations on various installations that were not covered by the survey. These unique situations are described in the report, wherever applicable. They simply reaffirm the complexity of solid waste management experienced by managers across the nation.

The responses to the survey were analyzed in a number of ways in order to facilitate identification of common characteristics and unique situations, such as referred to above. A group of 41 installations identifying their primary function/activity as being "Radar Site" were analyzed and reported separately because they comprise a unique grouping of Air Force installations. Where necessary, telephone calls were made to installations to resolve questions of meaning, unique or seemingly unusual waste management conditions, and appropriateness of response.

All results were studied and compared on a selected command-by-command basis, and with national data, whenever available. The computerized printout for all 160 responding installations is included as Appendix B; printouts of each command response could not be included because of their bulk.

This report discusses the results of those analyses. The discussion is organized according to a specific area of the waste management function, namely, type of mission function/activity; generation characteristics; collection practices; processing activities; disposal practices; costs; and recycling. In some areas, such as landfill disposal, responses

from the 1975 Environmental Status Report were analyzed. Where used, they are so noted.

B. Definitions

The following Environmental Protection Agency waste category definitions were used throughout this survey (Reference 1).

1. "Commercial solid waste" means all types of solid wastes generated by stores, offices, restaurants, warehouses and other non-manufacturing activities, and non-processing wastes such as office and packing wastes generated at industrial facilities.
2. "Construction and demolition waste" means the waste building materials, packaging, and rubble resulting from construction, remodeling, repair and demolition operations on pavements, houses, commercial buildings, and other structures.
3. "Institutional solid waste" means solid wastes generated by educational, health care, correctional, and other institutional facilities.
4. "Residential solid waste" means the wastes generated by the normal activities of households, including but not limited to, food wastes, rubbish, ashes, and bulky wastes.

The following command abbreviations are used in this report:

AAC	Alaskan Air Command
ADC	Aerospace Defense Command
AFLC	Air Force Logistics Command
ATC	Air Training Command
MAC/AFSC	Military Airlift Command/Air Force Systems Command
PACAF	Pacific Air Forces
SAC	Strategic Air Command
TAC	Tactical Air Command
USAF	United States Air Force

The Military Airlift Command (MAC) and Air Force Systems Command (AFSC) are combined because MAC became responsible for various Air Force Systems Command installations after Fiscal Year 76 (FY 76).

SECTION II

INSTALLATION FUNCTION/ACTIVITY AND WASTE GENERATION RELATIONSHIPS

A. Primary Functions and Related Waste Generation Characteristics

Although the goal of the Air Force is to "Fly and Fight" in support of the country's defense, not all installations have such a direct mission involvement. Consequently, it would be highly erroneous to associate all Air Force solid waste generation with strictly flying operations. To illustrate the diversity of the functions performed in support of the defense mission, each respondent was requested to indicate how they would best describe the primary function/activity on their installation. Twelve functional categories were offered in this regard. They were based on the investigator's experience, since the Air Force has no official categorization.

The data collected was correlated with daily generation of wastes and tabulated in Table 1. Although the solid waste generation data reported in the survey showed variances with other data subsequently reported to HQ USAF and the Environmental Protective Agency (see Section III), Table 1 does provide a fair representation of solid waste generation vis a vis mission support function.

Interestingly, only "Flying Operations" and "Radar Sites" showed a marked difference between their proportional relationships to the total number of reporting installations and the solid waste generated. For example, while "Flying Operations" comprised approximately 31 percent of the installations, they generated 45 percent of the waste; on the other hand, "Radar Sites" made up 26 percent of the installations, but contributed only about 6 percent. For most other functions, the proportional installation representations agreed very closely with the proportional waste generation representation. (Example: Industrial/Logistics Support installations comprised 10 percent of all installations; their waste generation amounted to approximately 9 percent of all the waste generated.)

B. Correlations Between Functions

An attempt was made to determine if installations reporting the same primary function generated similar amounts of waste as other installations with different functions. Unfortunately, the variances in solid waste generation from category to category were so significant that only installations with "Flying Training" showed a statistical probability that they generate similar quantities of solid waste as those with "Admin/Headquarters" and vice versa. (A 97.5 percent confidence level was chosen to account for the wide variance and possible errors anticipated in the reporting of solid waste quantities.)

TABLE 1. SUMMARY OF INSTALLATION SUPPORT FUNCTIONS AND SOLID WASTE GENERATION

Function/Activity	No. Installations	Total Installations (Percent)	Median Daily Tonnage (TPD)	Percent of Total Daily Tonnage (Percent)
Flying Operations	49	31	1222.5	45
Flying Training	22	14	345.0	13
Industrial/Logistics	10	6	250.0	9
Support				
Technical/Academic	10	6	230.0	8
Training				
Medical Services	0	0	0	0
Administrative/Headquarters	7	4	207.5	8
R&D Laboratory/Center	7	4	112.5	4
Flight Test Center	2	1	35.0	1
Test Range	6	4	55.0	2
Missile Operations	5	3	72.5	3
Ground/Basic Training	1	1	27.5	1
Radar Site	41	26	167.5	6
Total	160	100	2,725.0 **	100

** Relative values only. See Section III for more accurate solid waste generation data.

TABLE 2. DAILY SOLID WASTE GENERATION*

Average Daily Tonnage	Environmental Status Report**		USAF Weighing Survey**	
	Installations Responding	Percent	Installations Responding	Percent
0 - 4.9	21	17.6	18	16.8
5 - 9.9	14	11.8	12	11.2
10 - 14.9	17	14.3	21	19.6
15 - 19.9	16	13.4	23	21.5
20 - 24.9	12	10.1	14	13.1
25 - 29.9	9	7.6	4	3.7
30 - 34.9	8	6.7	3	2.8
35 - 39.9	5	4.2	2	1.9
40 - 44.9	4	3.4	4	3.7
45 - 49.9	3	2.5	3	2.8
50 - 54.9	5	4.2	1	0.9
55 - 59.9	1	0.8	1	0.9
60 - 64.9	0	0.0	0	0.0
65 - 69.9	1	0.8	0	0.0
70 - 74.9	1	0.8	0	0.0
75 - 79.9	0	0.0	0	0.0
80 - 84.9	1	0.8	0	0.0
85 - 89.9	1	0.8	0	0.0
90 - 94.9	0	0.0	1	0.9
95 - 99.9	0	0.0	0	0.0
100 plus	0	0.0	0	0.0
Total	119	99.8	107	99.8
Avg	21.5 TPD		17.8 TPD	
Median	15-19.9 TPD		15.7 TPD	

* Based on 260-day year

**No "Radar sites" included

SECTION III

WASTE GENERATION CHARACTERISTICS

A. General

The acquisition of precise daily waste quantities was difficult to obtain because of the nature of the survey questionnaire (which required respondents to answer to multiple choice ranges of value) and continuing difficulties at some installations in using volume (cubic yard) to tonnage conversion factors that adequately represent the local situation. Nevertheless, supplementary tonnage data was obtained from a weighing survey specifically directed by HQ USAF in March 1976 and reported to the Environmental Protection Agency (EPA) in November 1976. (Reference 2). This data, which theoretically was available at each base and should have been reported in the Environmental Status Report (which illustrates the problem of getting good data), is tabulated in Appendix C and used in the remainder of this section. The weighing survey did not include any installation generating less than 1.0 ton per day (TPD), which is peculiar to only a few bases.

This report focuses primarily on installations which do not fit into the "Radar Site" category. The surveys revealed that radar sites form a fairly unique class of installation and, as such, are reported separately in the last section of this report.

B. Daily Solid Waste Generation - Residential, Commercial, and Institutional

Table 2 tabulates daily solid waste generation as reported in both the Environmental Status Report and the USAF weighing survey. (Reference 3). Although installations generating less than 1.0 TPD were not reported in the weighing survey, supplementary information showed that waste generation ranged from a low of 0.041 TPD (a radar site) to 91.6 TPD at Hickam AFB, HI (flying operations). The average installation generated 17.8 tons per day. The median generation was 15.7 TPD. Ninety-seven percent of the installations generate less than 50.0 TPD; none generate more than 100.0 TPD. The annual generation for 107 non-radar sites reported in the USAF weighing survey totaled almost 500,000 tons. The daily quantity amounted to 1,901.5 tons.

Figure 1 provides a comparison of daily waste generation quantities among various commands. AFLC, which is Industrial/Logistics oriented, has a median generation rate over twice that of the USAF. The range of generation within each command is extensive and illustrates that caution must be exercised in applying average generation rates, USAF or command-specific, to individual installations. The median is usually a more reliable indicator and should be used if a need arises for such a statistic.

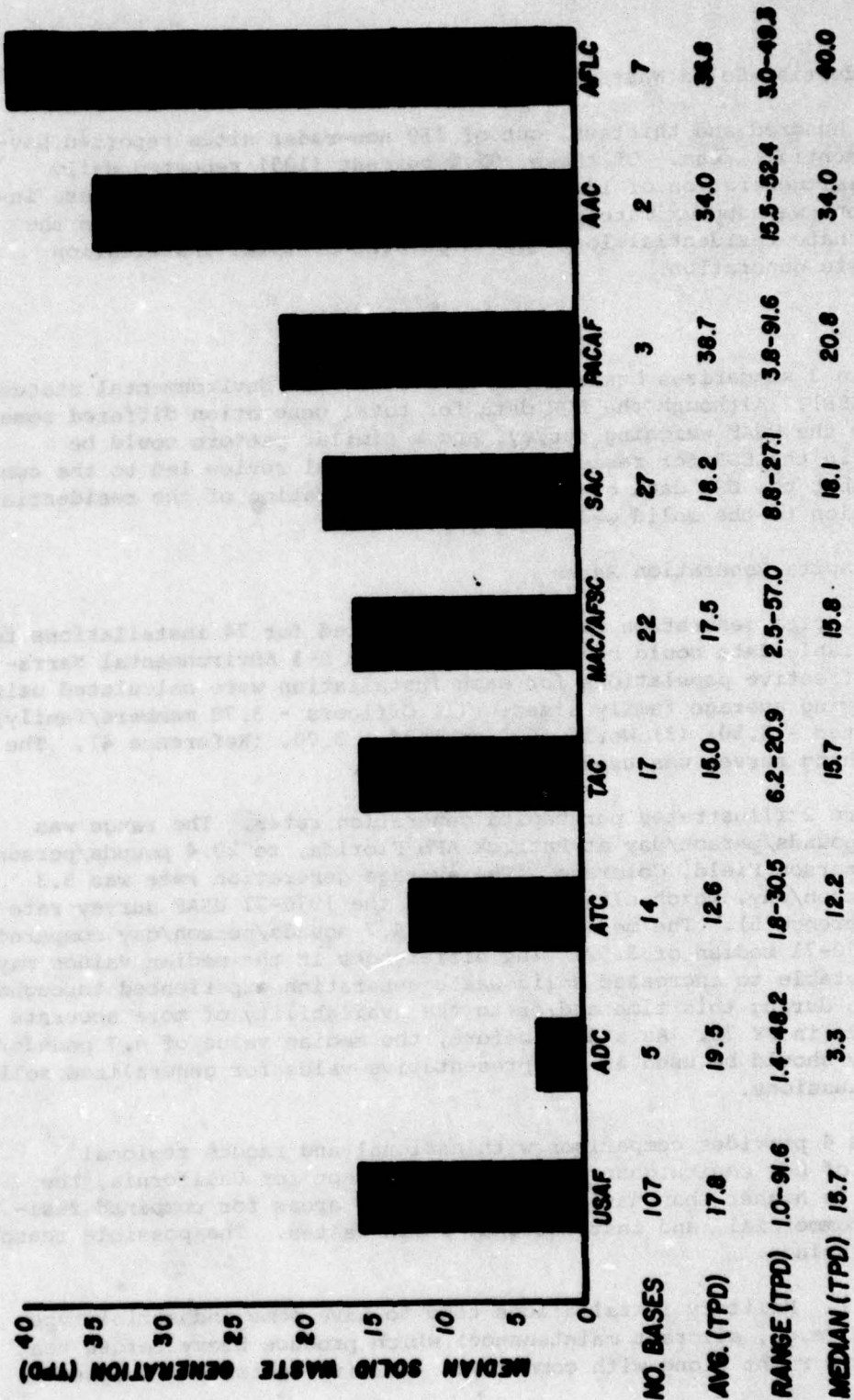


Figure 1. Comparison of USAF-Command Waste Generation

C. Residential Solid Waste Generation

One hundred and thirteen out of 119 non-radar sites reported having residential areas. Of these, 92.9 percent (105) reported daily residential generation of 14.9 tons or less. The average for these installations was approximately 5.7 TPD. For all 113 installations the proportionate residential load was 32 percent of total installation solid waste generation.

Table 3 summarizes basic data reported in the Environmental Status Report (ESR). Although the ESR data for total generation differed somewhat from the USAF weighing survey, and a similar pattern could be expected in the ESR for residential data, careful review led to the conclusion that the ESR data gives a good representation of the residential contribution to the solid waste stream.

D. Per Capita Generation Rates

Per capita generation rates were calculated for 74 installations for which reliable data could be obtained from TAB A-1 Environmental Narratives. Effective populations for each installation were calculated using the following average family sizes: (1) Officers - 3.78 members/family; (2) Enlisted - 3.50; (3) Worldwide combined - 3.70. (Reference 4). The USAF weighing survey was used for weight data.

Figure 2 illustrates per capita generation rates. The range was from 0.9 pounds/person/day at Patrick AFB Florida, to 20.4 pounds/person/day at Peterson Field, Colorado. The average generation rate was 5.3 pounds/person/day, which slightly exceeded the 1970-71 USAF survey rate of 5.11 (Reference 5). The median value was 4.7 pounds/person/day compared to the 1970-71 median of 3.52. The differences in the median values may be attributable to increased solid waste generation experienced throughout the nation during this time and/or to the availability of more accurate weight data in FY 76. As stated before, the median value of 4.7 pounds/person/day should be used as a representative value for generalized solid waste discussions.

Table 4 provides comparison with national and random regional samplings of per capita generation rates. Except for California, the USAF rate is higher than national and regional areas for combined residential, commercial, and institutional solid wastes. The possible reasons for this include:

1. Military installations tend to have some industrial-type activities (e.g., aircraft maintenance) which produce heavy refuse that is collected right along with commercial activity wastes and weighed as such.

TABLE 3. SUMMARY OF RESIDENTIAL DAILY SOLID WASTE GENERATION

<u>Average Daily Tonnage</u>	<u>Installations Responding</u>
0 - 4.9	53 (46.9%)
5 - 9.9	37 (32.7%)
10 - 14.9	15 (13.3%)
15 - 19.9	3 (2.6%)
20 - 24.9	1 (0.9%)
25 - 29.9	0 (0.0%)
30 - 34.9	2 (1.8%)
35 - 39.9	2 (1.8%)
40 - 44.9	0 (0.0%)
45 - 49.9	0 (0.0%)
50 plus	0 (0.0%)
	<u>113 (100.0%)</u>

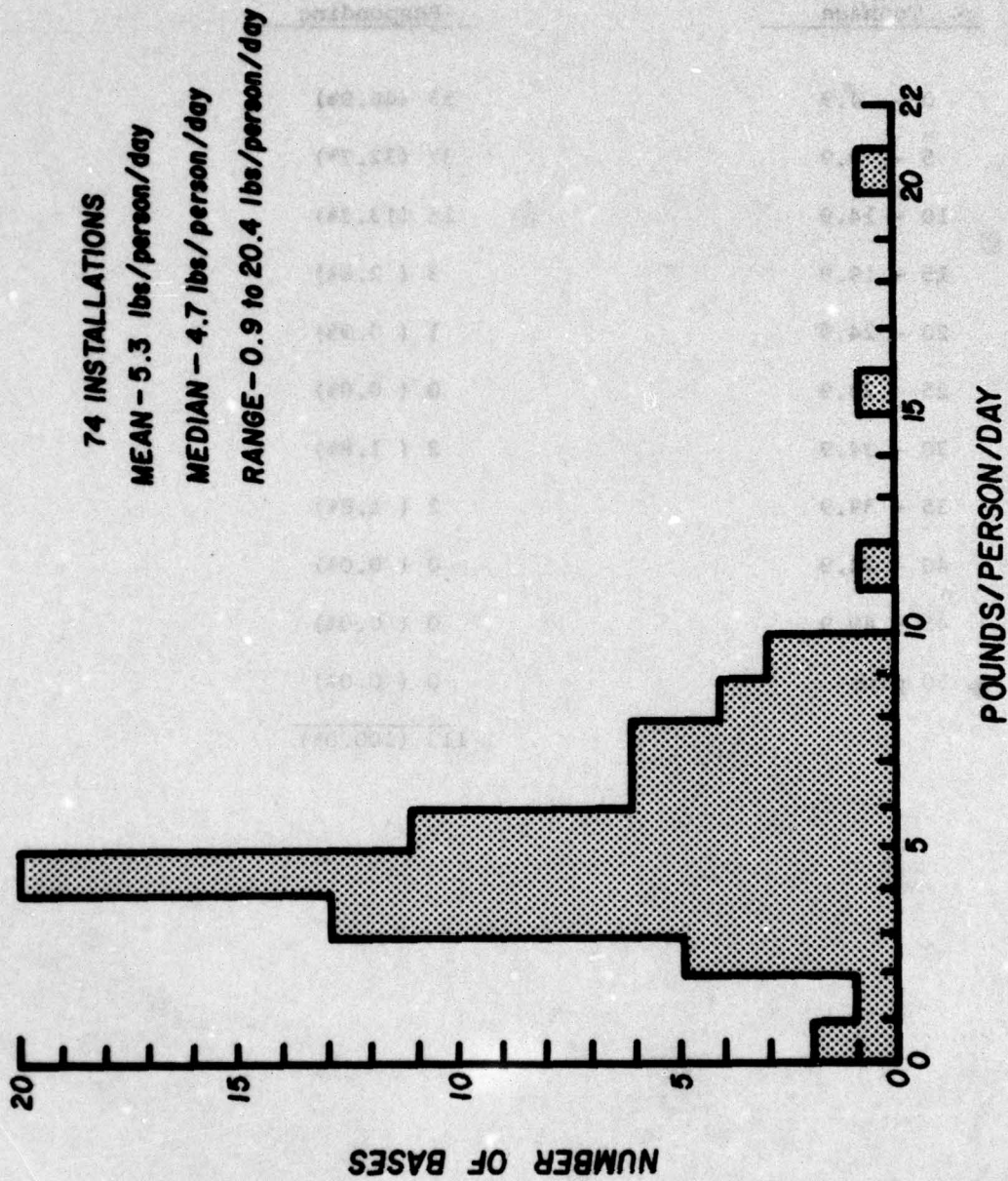


Figure 2. Base Solid Waste Frequency Diagram for Per Capita Generation

TABLE 4. PER CAPITA GENERATION RATES-USAF, NATIONAL, AND REGIONAL

Residential, Commercial And Institutional Rates

Source	Year	Pounds/Capita/Day	Reference
USAF	1975-76	4.7	-
National (US EPA)	1975	3.2	6
California	1975	4.7	7
Ohio	1974	3.1	8
Denver, Colorado	1975	4.0	9

Residential Rates

Source	Year	Pounds/Capita/Day	Reference
USAF	1975-76	2.1	-
National (US EPA)	1973	2.2	10
Denver, Colorado	1975	2.4	9
Cincinnati, Ohio	1970-73	2.1	8
US EPA	1972-73	2.4	8

2. Military installations can be expected to collect a higher proportion of solid wastes than civilian communities. In the civilian environment, wastes often do not reach accountable disposal sites because of on-location incineration, burying, indiscriminate dumping, highway littering, inadequate collection services, collection rates, and selective source separation for recycling (Reference 11).

Residential generation averaged 2.5 pounds/person/day. The median rate was 2.1. These rates showed close agreement with national and regional statistics. The range was from 0.44 to 25.9 pounds/person/day.

E. Sludges, Street Sweepings, Demolition, and Ground Wastes

All installations were requested to indicate their daily generation of wastewater treatment sludges, street sweepings, demolition wastes, and ground maintenance wastes. The results are tabulated below.

TABLE 5. SLUDGES, DEMOLITION, SWEEPINGS,
AND GROUND WASTES

<u>Average Daily Tonnage</u>	<u>Installations Responding</u>
0 - 4.9	61 (51.3%)
5 - 9.9	6 (5.0%)
10 - 14.9	2 (1.7%)
15 - 19.9	0 (0.0%)
20 - 24.9	1 (0.8%)
25 plus	5 (4.2%)
Unknown	<u>44 (37.0%)</u>
Total	119 (100.0%)

SECTION IV

RESIDENTIAL COLLECTION PRACTICES

A. General

Productivity and effectiveness are key concerns of managers in all endeavors. For installation solid waste managers both of these are directly tied to the collection arrangements and service levels employed. The following discussion keys into these areas and compares them to national practices.

B. Bulky "White Goods" Collection

Separate collection of bulky, "white goods" items, such as appliances, furniture and tree limbs, can be an expensive service, although some installations probably have no choice because of collection vehicle capacity restrictions, crew size, or other resource limitations, which preclude simultaneous collection of the items with normal residential waste. Picking up these items on a separate fixed schedule is normally only efficient if there are usually many pickups to be made. On-call collection is usually efficient because collectors only have to go where there are pickups to be made, and proper scheduling can make it possible to concentrate pickups in compact areas. Another method employed is to use the normal collection crews to report bulky items set out for pickup and then to utilize another crew to collect them. The latter system can lead to items sitting outside for more than one day unless radio communication is available. In addition, such reports will be sporadic and result in inefficient routing of the bulk-pickup vehicles. (Reference 13).

The data from reporting installations indicates that the Air Force collection of bulky items is usually done efficiently. Of those installations with residential areas, 49.1 percent pick up bulky items when the regular refuse is collected. Another 32.1 percent make separate collections on an on-call basis. Only 18.8 percent reported pickups on a fixed schedule.

C. Residential Collection Arrangements

Contract collection dominates USAF collection arrangements. As Table 6 indicates, 83.2 percent of the installations used contractor services. This compared with the national practice of using private industry for residential collection 45.2 percent of the cities. (Some of these cities use both contractor and municipal services; 66.7 percent of all cities used both municipal agencies and private industry, while 32.5 percent used municipal agencies exclusively) (Reference 14). Only AFLC and AAC ran contrary to the USAF pattern, although two AFLC installations (out of five with in-house services) were planning to change to contractor operation. The AAC consists mainly of radar sites

TABLE 6. RESIDENTIAL COLLECTION ARRANGEMENTS

Source	Year	Arrangement (%)		Total Installations
		Contractor	In-House	
National *	1975	45.2% (a)	32.5% (a)	NA
National **	1977	47.0 (b)	53.0 (c)	NA
USAF (d)	1976	83.2	16.8	113
AAC	1976	0.0	100.0	17
AFLC	1976	16.7	83.3	6
ATC	1976	86.6	13.4	15
SAC	1976	92.9	7.1	28
MAC/AFSC	1976	94.7	5.3	19
ADC	1976	97.3	2.7	37
TAC	1976	100.0	0.0	18

* Reference 14

** Reference 18

(a) 66.7 percent of cities use both arrangements.

(b) Private haulers handle 31 percent, and combination of private and municipal crews handle 16 percent.

(c) Regionally, the southeast and southwest have predominantly municipal collection, at 69 and 72 percent, respectively. Private collection is strong in the Far West (53 percent private, 16 percent combined); Midwest (41 percent private, 16 percent combined); and in cities with less than 50,000 population (40 percent private, 7 percent combined) (Reference 19).

(d) Radar sites not included.

whose remote locations appear to preclude contractor operation. TAC uses contractor services exclusively.

The predominance of contract services appears to reflect both manpower utilization policies and economics. In the former regard, Air Force Regulation (AFR) 26-10 does not recognize any military positions in refuse collection and disposal services as being military essential, which therefore requires either in-service civilian or contract manning. The same regulation also requires each installation to analyze and employ the most economical means of service (Reference 15). In this regard, economics will favor the most productive arrangement, which usually means private industry rather than governmental operation. For example, a national study in 1974-75 provided evidence which suggests that contract operation is more efficient (in terms of cost) than municipal collection for cities up to 10,000 population. This study indicated that factors contributing to high municipal cost (in cities over 50,000 people; however, the factors certainly have relevance to smaller areas) include: higher employee absentee rates (12.0 percent versus 7.5 percent) among municipal refuse collection agencies; fewer households served per shift (632 versus 686); more time spent servicing each household (4.35 man-hours per year versus 2.37); larger crews employed (3.26 men versus 2.18); less likely to utilize labor incentive systems (80.0 percent versus 89.0 percent); and use of smaller trucks (19.8-cubic-yard capacity versus 23.1) (Reference 16). Other surveys appear to substantiate the 1974-75 findings, although percentages do vary (Reference 17, 18, and 19).

Some installations reported differences in their collection arrangements when they utilized "Family Housing Annexes" which are located off-base. For example, Maxwell AFB, Alabama, uses in-house collections and on-base disposal for their on-base residential areas. However, they use contractor collection and off-base landfill disposal for servicing Maxwell's off-base housing annex.

D. Residential Service Levels - Point of Collection

Curbside and back alley service was accomplished by 65.5 percent of the installations. This compares very closely to 60.0 percent curbside and alley collection nation-wide (Reference 20). Table 7 provides a summary and selected command comparisons.

Curbside service is the most economical point of collection practice. However, the issue of curbside versus backyard service appears to have been as difficult to resolve on some installations as it has in civilian communities. Curbside service requires residents to carry their refuse to the curb rather than leave it to be collected at the back door. In the civilian sector, this decrease in service level manifests itself as a political consideration which often takes precedence over economic savings (Reference 21). Similarly, although HQ USAF has directed that curbside service be utilized wherever economically justified, some managers cite morale and welfare losses as reasons to

TABLE 7. RESIDENTIAL SERVICE LEVELS - TYPE AND METHOD

I. Service Type	National	USAF*	Percent of Specific Service					ADC	TAC
			AAC	AFLC	ATC	SAC	MAC/AFSC		
Curbside/Back Alley Service	60.0	65.2	11.8	83.3	60.0	60.7	68.5	75.7	72.2
Non-Curbside/Back Door Service	40.0	34.5	88.2	16.7	40.0	39.3	31.5	24.3	27.8
II. Service and Method									
Contractor, Curbside/Back Alley	NA	54.0	0.0	0.0	53.3	53.6	63.2	75.7	72.2
Contractor, Non-Curbside/Back Door	NA	29.2	0.0	16.7	33.3	39.3	31.5	21.6	27.8
In-house, Curbside/Back Alley	NA	11.5	11.8	83.3	6.7	7.1	5.3	0.0	0.0
In-house, Non-Curbside/Back Door	NA	5.3	88.2	0.0	6.7	0.0	0.0	2.7	0.0
Total Installations	NA	113	17	6	15	28	19	37	18

* Does not include Radar Sites.

maintain (or switch back to) backyard collection, despite savings evident with curbside operation (References 22 and 23). (See "Plans to Change" Section below.)

E. Residential Service Levels - Collection Frequency

The majority of installations (69.0 percent) utilize two pickups per week, which directly contrasts to national statistics indicating that from 50.0 to 59.7 percent of cities utilize only one pickup per week (References 24, 25, and 26). As indicated in Table 8, only AFLC uses once per week collection predominately. The AAC, with its many radar sites which usually have dormitory units only and use the commercial collection system for pickups, uses three or more collections per week.

The reason for predominance of twice-a-week service can only be speculated at, although indications are that it stems from climate variations, health control beliefs, and governmental requirements (a 1974-75 survey showed that governments tend to overproduce services) (Reference 27). However, studies have shown that with properly sealed containers and sufficient storage capability, health problems (i.e., with flies and vectors) can be avoided and once-a-week collection is possible and economical. For example, the same studies have shown that relatively efficient systems can realize 23 to 33 percent fewer vehicle requirements for once-a-week vis a vis twice-a-week collection; fuel consumption is about 30 percent less. Collectively, the reduction in trucks, manpower and miles driven can cut costs by as much as 50 percent (References 28 and 29). Use of bags and or the 80-gallon-plus wheeled containers now on the market may provide both the security and storage capabilities needed to adopt once-a-week service, although state or regional regulations must still be investigated to determine if such service is allowable. Air Force regulations do allow collection frequencies of less than twice a week.

One installation (Shaw AFB) reported that the level of service is related to whether garbage disposals are used or not. For example, once-a-week collection is used in housing areas which have garbage disposals; the frequency is twice-a-week where garbage disposals are not present.

The response of installations was further analyzed to determine if there were any relationships among collection frequency, arrangements and point of collection. Table 9 tabulates the results of this analysis. When contractor services were employed, over 75 percent of collections were twice-a-week, regardless of whether curbside or back door pickup was used. In contrast, only in-house, non-curbside, collection frequency showed a similar tendency. On the other hand, in-house, curbside service showed a fairly equal distribution of collection frequencies of from 1 to 3 weekly pickups. The number of installations included in this group was small, however, when compared to contractor, curbside collection. AFLC accounted for much of the variation. For example, of the 13 installa-

TABLE 8. RESIDENTIAL SERVICE LEVELS - COLLECTION FREQUENCY

Pickups Per Week	Percent of Pickups					SAC	MAC/AFSC	ADC	TAC
	(a) National	(b) National	(c,d) National	(e) USAF	AAC	ATC	AFLC	ATC	
1	50.0	59.7	53.0	20.4	0.0	66.7	6.7	21.4	32.4 27.8
2	45.0	NA	40.0	69.0	0.0	0.0	86.7	75.0	54.5 66.6
3		NA		8.0	88.2	16.7	6.7	3.6	0.0
More	5.0	NA	2.0	1.8	11.8	16.7	0.0	0.0	0.0
Combination		NA	NA	0.9	0.0	0.0	0.0	0.0	0.0 5.6

(a) Reference 24

(b) Reference 25

(c) Reference 26

(d) This survey indicated that 4.0 percent of cities collect on an "on-call" basis, and 1.0 percent collect less than once a week.

(e) Does not include Radar Sites.

TABLE 9. RESIDENTIAL SERVICE LEVEL
AND COLLECTION ARRANGEMENT RELATIONSHIPS

Number of Weekly Pickups	Installations with Contractor Collection		Installations with In-House Collection	
	Curbside	Non-Curbside	Curbside	Non-Curbside
1	18.0%	18.2%	38.5%	16.7%
2	75.4%	75.8%	30.8%	50.0%
3	4.9%	6.1%	23.1%	16.7%
More	0.0%	0.0%	7.1%	16.7%
Total Installa- tions	61*	33	13	6

* One installation reported once-a-week collection in two housing areas with garbage disposals, and twice-a-week in two areas without garbage disposals. This collection combination represents 1.7 percent of the 61 installations.

tions comprising this group, 5 belonged to AFLC; 3 of its installations had once-a-week collection, 1 had 3-times-a-week service, and 1 had more than 3-times-a-week operation.

F. Residential Collection - Plans For Change

All installations were asked to indicate if they planned to change their FY 76 method of residential area collection during FY 77. The response is tabulated in Table 10. Most installations had no plans to change their arrangements or service level. All installations using in-house, non-curb/curbside/back door collection planned to stay with it, although that number of installations is small. The data clearly shows that contractor operation is preferable over in-house service.

TABLE 10. RESIDENTIAL COLLECTION - PLANS FOR CHANGE

New Method	Contractor		Current Methods		In-House	
	with Curbside	with Non-Curbside	with Curbside	with Non-Curbside	with Curbside	with Non-Curbside
1. No Change	93.4%	84.8%	46.2%		100.0%	
2. Contractor with Curbside	0.0%	12.1%	23.1%		0.0%	
3. Contractor with Non-Curbside	3.3%	0.0%	0.0%		0.0%	
4. In-House with Curbside	0.0%	0.0%	0.0%		0.0%	
5. In-House with Non-Curbside	0.0%	0.0%	0.0%		0.0%	
6. Undecided	3.3%	3.0%	30.7%		0.0%	
Number of Installations	61	33	13		6	

Note: Percentages indicate how many installations plan to change from the current method (FY 76) listed at the top to a new method listed on the left. For example, 23.1 percent of the installations using in-house curbside collection planned to change to contractor, curbside collection.

SECTION V

COMMERCIAL AND INSTITUTIONAL COLLECTION PRACTICES

A. Collection Arrangements and Service Levels

Contractor service accounts for 58.8 percent of non-radar site commercial and institutional solid waste collections. (See Table 11.) This compares closely to the 60.0 percent of United States cities that use private industry for commercial/industrial solid waste collection (Reference 30). SAC, AFLC, and AAC are the biggest users of in-house services. Installations using contract services predominantly use scheduled pickups, whereas in-house operations primarily employ a combination of scheduled and on-call collections.

B. Use of Same Arrangements in Both Commercial and Residential Areas

Unlike some cities, USAF does not have both private industry and in-house resources service commercial and institutional wastes on the same installation (except for recycling programs). However, 26.5 percent of the installations with both residential and commercial/institutional areas employ in-house collection services in one area and contract operations in the other. A majority of installations use the same arrangement in both areas rather than a mix, as can be seen in Table 12.

C. Commercial/Institutional Collection - Plans For Change

All installations were asked if they planned to change their FY 76 method of collection during FY 77: 75.6 percent said no changes were contemplated; 7.6 percent were undecided; and 16.8 percent said "yes". Although specific changes were not identified, most installations planning to do so indicated they were changing or thinking of changing from in-house combined on-call and scheduled service levels to some other arrangement and/or service level.

TABLE 11. COMMERCIAL AND INSTITUTIONAL COLLECTION ARRANGEMENTS
AND SERVICE LEVELS

Arrangement & Service Level	Percent of Installations with Specific Arrangements								
	National ^(a,b)	USAF ^(c)	AAC	AFLC	ATC	SAC	MAC/AFSC	ADC	TAC
I. Contractor									
A. with on-call pickups	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B. with scheduled pickups	NA	71.4	0.0	100.0	38.5	60.0	86.7	89.2	83.3
C. with combination	NA	28.6	0.0	0.0	61.5	40.0	13.3	10.8	16.7
Number of installations	NA	70	0	1	13	10	15	37	12
Percentage of all installations	60.0	58.8	0.0	14.3	86.7	35.7	68.2	97.4	66.7
II. In-house									
A. with on-call pickups	NA	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
B. with scheduled pickups	NA	34.7	0.0	16.7	50.0	50.0	14.3	0.0	33.3
C. with combination	NA	65.3	100.0	83.3	50.0	50.0	85.7	0.0	66.7
Number of installations	NA	49	17	6	2	18	7	1	6
Percentage of all installations	40.0	41.2	100.0	85.7	13.3	64.3	31.8	2.6	33.3

(a) Reference 30

(b) National figures are broken out as commercial/industrial, but do provide reasonable comparison data.

(c) Does not include Radar Sites.

TABLE 12. USE OF SAME COLLECTION ARRANGEMENTS IN BOTH
RESIDENTIAL AND COMMERCIAL/INSTITUTIONAL AREAS

<u>Arrangement</u>	<u>USAF*</u>	<u>AAC</u>	<u>AFLC</u>	<u>ATC</u>	<u>SAC</u>	<u>MAC/AFSC</u>	<u>ADC</u>	<u>TAC</u>
I. Contractor - both areas								
A. Number of installations	64	0	0	13	10	12	36	12
B. Percentage of total	56.6	0.0	0.0	86.7	35.7	63.2	94.7	66.7
II. In-house - both areas								
A. Number of installations	19	17	5	2	2	1	1	0
B. Percentage of total	16.8	100.0	83.3	13.3	7.1	5.3	2.6	0.0
III. Mix - contractor and in-house								
A. Number of installations	30	0	1	0	16	6	0	6
B. Percentage of total	26.5	0.0	16.7	0.0	57.1	31.6	0.0	33.3
Total installations	113	17	6	15	28	19	37	18

* Does not include Radar Sites.

SECTION VI

PROCESSING OF WASTES

Installations process their wastes in many ways, although over one-half do nothing other than collect their residential, commercial, and institutional wastes. As Table 13 indicates, compaction is common to all waste producing areas (installations were asked to exclude the compaction capability of the collection vehicles in responding to the question on residential solid waste). Commissaries and base exchanges (retail stores) usually process their solid wastes by compaction, baling, or a combination of 2 or more processes. Incineration is used, although by few installations. A large proportion (87.4 percent) of installations indicated no plans to increase their solid waste processing capabilities in FY 77; none of the installations were asked if they planned to decrease their processing capabilities.

TABLE 13. PROCESSING OF WASTE

Percent of Installations By Collection Area

Processing Type	Residential	Commissary	Base Exchange	Commercial/* Institutional
Compaction	18.5	21.7	18.5	20.2
Baling	0.0	20.0	19.3	0.0
Incineration	3.6	1.8	2.5	5.0
Shredding	0.8	0.0	0.0	0.8
Other	13.3	11.3	9.2	10.1
Two or more of the above	0.8	24.3	18.5	10.1
None	62.9	20.9	31.9	53.8
Total Installations	113	115	119	119

*Does not include commissary and base exchange wastes.

SECTION VII

DISPOSAL PRACTICES

A. Disposal Practices and the Collection Arrangement

Off-base disposal is favored by a majority of the non-radar site installations. Approximately 63 percent of installations with residential areas dispose of these solid wastes off-base. The figure is 55 percent for commercial/institutional waste disposal.

Installations using contract collection services usually utilize off-base disposal. For example, of the 94 installations using contract residential collection, 66 (70.2%) dispose of their residential wastes off-base. Similarly, the figure is 75.7 percent for the 70 installations using contractual commercial/institutional waste collection services.

In contrast to contractual arrangements, use of in-house collection services is likely to be accompanied by on-base disposal. Of the 19 installations using in-house residential collection, 10 (53 percent) use on-base disposal. Similarly, for in-house commercial/institutional collection, 31 of 49 installations (63 percent) dispose on base.

A few installations utilize both on-base and off-base disposal for the same collection areas. Three installations had residential area contract disposal in this manner and five installations had their in-house collected residential wastes disposed of both on and off base. Such a disposal combination for commercial/institutional waste was found only with seven installations, which used in-house forces for the work.

B. On-Base Sanitary Landfills

Less than one-half (47.1 percent) of the non-radar site installations use on-base sanitary landfills. They are listed in Table 14. However, only 22.7 percent (27 installations) use on-base sanitary landfill disposal exclusively for all their solid wastes.

Of the installations, 22.2 percent did not know how much refuse was daily disposed of in their landfill (Reference Table 15). For those that do use on-base landfills, the median tonnage disposed of is in the range of 15 - 19.9, which corresponds to the median daily generation (Reference Table 2). (However, some of this tonnage represents other users of the landfill.) Of these landfills, 91.2 percent receive less than 50.0 tons per day. This compares to the 1976 national disposal picture in which approximately two-thirds (66.7 percent) of the known sites receive less than 50.0 tons per day. (The number of national sites in this tonnage category is expected to be reduced by one-half in the near future as a result of more stringent pollution control laws and waste management regionalization (Reference 31).

TABLE 14. INSTALLATIONS WITH ON-BASE LANDFILL DISPOSAL*

Eielson	Grand Forks
Elmendorf	Griffiss
Tyndall	K. I. Sawyer
AFA	Kincheloe (Now deactivated)
Maxwell	Loring
Lowry	Malmstrom
Moody	Minot AFB
Robins	Offutt
Tinker	Plattsburgh
Wright-Patterson	Rickenbacker
Arnold EDC	Vandenberg
Brooks	Whiteman
Edwards	Wurtsmith
Eglin	Bergstrom
Kirtland	Cannon
Patrick	Gila Bend
McChord	Holloman
Norton	Indian Springs
Scott	Langley
Andersen	MacDill
Barksdale	Mt. Howe
Beale	Nellis
Blytheville	Seymour-Johnson
Castle	Shaw
Davis Monthan	Goodfellow
Ellsworth	Dobbins
F. E. Warren	King Salmon Airport
Fairchild	Hurlburt Field

Total: 56 installations

* No Radar Sites included.

TABLE 15. FY76 AVERAGE DAILY TONNAGE - ON-BASE SANITARY LANDFILLS*

<u>Tonnage</u>	<u>Percent of Installations</u>
0 - 4.9	12.5
5 - 9.9	8.9
10 - 14.9	17.9
15 - 19.9	16.1
20 - 24.9	8.9
25 - 29.9	14.3
30 - 34.9	3.6
35 - 39.9	1.8
40 - 44.9	5.4
45 - 49.9	1.8
50 - 54.9	3.6
70 - 74.9	3.6
85 - 89.9	1.8

Median tonnage: 15 - 19.1

* Radar Sites not included.

C. Use of On-Base Sanitary Landfills by Others

As indicated in Table 16, 20.0 percent of installations with sanitary landfills also dispose of waste from other Air Force, federal, or non-federal organizations/agencies. Of these 11 installations, only one (Beale) receives a tipping/dumping fee. The fee is in the range of \$7.00 to \$7.99 per ton.

D. Life Expectancy - On-Base Sanitary Landfills

Of installations with landfills, 33.9 percent had anticipated remaining landfill lifetimes of 4 years or less. However, 17 out of the 19 installations with 4 years or less had selected another site or alternate means of disposal. Only the Air Force Academy and Nellis indicated otherwise. (See Table 17.)

E. Exclusions From On-Base Landfill Use

Proper sanitary landfill operation does not allow receipt of certain wastes that are known to be chemically or biologically unstable, or hazardous to landfill personnel or nearby population. At the time of this survey a nationally uniform set of rules for what can or cannot go into sanitary landfills was not in force; however, guidelines were available from Environmental Protection Agency (EPA) documents and AFM 91-11 (Reference 32 and 33).

The survey response to exclusions is tabulated in Table 18. Almost 50 percent of the installations exclude industrial wastes. Construction and demolition wastes, which are bulky and difficult to reduce in volume and can damage compaction equipment, are excluded from 38.6 percent of the installation sanitary landfills. Infectious wastes, which are generally referred to as pathological wastes and normally processed through special incinerators, are excluded from 89.5 percent of the 56 installations with on-base landfill disposal. The remaining sites hopefully follow the EPA recommendation that they be buried immediately under one foot of cover material (Reference 34).

Although raw sewage sludges should not be placed in a sanitary landfill, dewatered sludges received from water treatment plants and dewatered digested sludges from waste water treatment plants can be placed in the landfill and covered immediately. If their moisture content is relatively high, the sludges should be mixed with other solid wastes before being covered in order to minimize the potential for localized leaching (Reference 35). In this regard, 65.0 percent of the installations exclude sludges, and 79.0 percent exclude liquid wastes.

F. On-Base Sanitary Landfills - Other Data

Table 19 contains landfill planning site characteristics, and operational and pollution control data gathered from the 1975 Environmental Status Report.

TABLE 16. USE OF ON-BASE SANITARY LANDFILLS BY OTHERS*

<u>Use</u>	<u>Percent of Those With On-Base Landfills</u>
A. Other Air Installations Only	3.8
Maxwell Loring	
B. Off-Base Federal Agencies Only	5.4
Langley Beale Vandenberg	
C. Non-federal Organizations Only	3.6
Arnold EDC Seymour Johnson	
D. Other AF Installations and Off-Base Federal Agencies Only	1.8
Tinker	
E. Other AF Installations and Non-federal Organizations	0.0
F. Federal Agencies and Non-federal Organizations Only	1.8
Kirtland	
G. AF Installations, Federal and Non-federal Organizations	3.6
Patrick Edwards	
H. No Others Use On-Base Landfill	80.0

*No Radar Sites included

TABLE 17. LIFE EXPECTANCY - ON-BASE SANITARY LANDFILLS (a)

<u>Expected Lifetime (b)</u>	<u>Percent of Installations with On-Base Landfill</u>
6 Months	71.1
*Tyndall *Norton *Shaw *Castle	
1 Year	8.9
AFA *Robins *Lowry *Wright-Patterson *Offutt	
2 Years	5.4
*Langley * Elmendorf *Beale	
3 Years	5.4
*Moody *Scott Nellis	
4 Years	7.1
*Arnold EDC *Hurlburt Field *Ellsworth	
5 Years	10.7
6 Years	1.8
6 - 10 Years	10.7
Over 10 Years	42.9

(a) No Radar Sites included.

(b) Installations with short term life expectancy (4 years or less) are listed with their respective category.

* Other landfill site or alternate disposal means selected.

TABLE 18. EXCLUSIONS FROM ON-BASE LANDFILL USE (a)

The following percentages reflect waste exclusions with on-base sanitary landfills. Installations with specific exclusions are listed.

I. Construction, Demolition, Industrial Wastes

A. <u>All of the Above</u>	B. <u>Construction, Demolition Only</u>	C. <u>Industrial Only</u>	D. <u>No Exclusions</u>
28.1%	10.5%	21.5%	40.4%

Installations are listed for the following exclusions:

Holloman
Plattsburgh
Arnold EDC
Blytheville
Dobbins

Cannon
Fielson
Vandenberg
Langley
Elmendorf
Kincheloe
Fairchild
K I Sawyer
Loring
Edwards
Robins
Ellsworth
Castle
Seymour-
Johnson
Minot AFB
Hancock
King Salmon
Airport
Mt Home

II. Infectious Wastes - 89.5% Exclusion

III. Sludges and Liquid Wastes

A. <u>Both of the Above</u>	B. <u>Sludges Only</u>	C. <u>Liquid Wastes Only</u>	D. <u>No Exclusions</u>
63.2%	1.8%	15.8%	17.5%

Installations are listed for the following exclusions:

Eglin

Robins
Edwards
MacDill
Norton
Rickenbacker
K. I. Sawyer
Arnold EDC

Cannon
Minot AFB
AFA
Whiteman
King Salmon
Apt
Ellsworth
F E Warren
Loring

(a) Radar Sites are not included

TABLE 19. ON-BASE SANITARY LANDFILLS - OTHER DATA

The following data on on-base landfills was collected in the 1975 Environmental Status Report. They include radar-site landfills; nevertheless, characterization of the non-radar site landfills will be adequately represented by the data presented. Percentages represent response of those landfill-using installations.

I. Planning and Design

A. Was a detailed design made for the landfill?

37.8% 1. Yes

62.2% 2. No

B. Is an operational plan available for the landfill?

21.6% 1. Yes, and it was prepared by a professional engineer.

58.1% 2. Yes, but it was not prepared by a professional engineer.

20.3% 3. No operational plan available.

II. Site Characteristics

A. What is the maximum depth of excavation?

5.3% 1. Less than 3 feet

8.0% 2. 3 to 5 feet

20.0% 3. 6 to 8 feet

24.0% 4. 9 to 11 feet

8.0% 5. 12 to 14 feet

5.3% 6. 15 to 17 feet

18.7% 7. 18 to 20 feet

10.7% 8. Deeper than 20 feet

TABLE 19. ON-BASE SANITARY LANDFILLS - OTHER DATA (CONTINUED)

B. What is the approximate depth to the predicted high of the groundwater table?

9.1%	1. Less than 3 feet
11.7%	2. 3 to 5 feet
5.2%	3. 6 to 8 feet
3.9%	4. 9 to 11 feet
3.9%	5. 12 to 14 feet
7.8%	6. 15 to 17 feet
2.6%	7. 18 to 20 feet
55.8%	8. Deeper

C. What is the closest approximate distance to the nearest surface water (pond, lake, stream)?

7.9%	1. Less than 100 feet
1.3%	2. About 100 feet
9.2%	3. About 200 feet
6.6%	4. Between 300-500 feet
6.6%	5. Between 500-1000 feet
7.9%	6. About 1000 feet
9.2%	7. About 1/2 mile
43.4%	9. One mile or more

TABLE 19. ON-BASE SANITARY LANDFILLS - OTHER DATA (CONTINUED)

D. What is the distance to the nearest inhabited building or complex of buildings?

34.2%	1. Less than 1/4 mile
30.3%	2. About 1/2 mile
11.8%	3. About 3/4 mile
23.7%	4. One mile or more

E. What is the distance to the nearest residential area?

5.3%	1. Less than 1/4 mile
15.8%	2. About 1/2 mile
10.5%	3. About 3/4 mile
68.4%	4. One mile or more

III. Operational Control

A. Is the landfill covered with earth and compacted on a daily basis?

71.6%	1. Yes
1.4%	2. No, every other day
9.5%	3. No, about once per week
17.6%	4. No, several times each month

Note: Climate conditions at some northern sites may preclude necessity for daily cover.

B. Are completed areas of the landfill covered with at least two feet of compacted earth?

86.8%	1. Yes
13.2%	2. No

TABLE 19. ON-BASE SANITARY LANDFILLS - OTHER DATA (CONTINUED)

C. What method is used for compaction at the landfill?

80.3%	1. The treads on the tractor
9.2%	2. A sheeps-foot roller or similar high density compactor
10.5%	3. We do not compact

D. Are safety equipment such as hard hats, gloves, footwear, fire extinguishers, seatbelts, rollbars, etc., required and used?

66.2%	1. Yes
33.8%	2. No

E. Are pesticides used for control of insects?

23.3%	1. Yes, monthly or more often
38.4%	2. Yes, but only occasionally
38.4%	3. No

F. Are pesticides used for control of rodents?

8.1%	1. Yes, continuously
32.4%	2. Yes, periodically
59.5%	3. No

G. Are pesticides used for control of birds?

1.4%	1. Yes, continuously
11.0%	2. Yes, periodically
87.7%	3. No

Note: See Appendix D for article on waste disposal and the bird aircraft strike hazard (BASH).

TABLE 19. ON-BASE SANITARY LANDFILLS - OTHER DATA (CONCLUDED)

IV. Pollution Control

A. Which best describes leachate control measures?

44.2%	1. None
45.4%	2. Surface water runoff diverted away from fill operation
3.9%	3. Incorporate natural or artificial impermeable barrier in the excavations
5.2%	4. Do both 2 and 3, above
0.0%	5. Incorporate a leachate treatment process
1.3%	6. Do 5 and 2, and/or 3, above

B. Are special means, such as vents or barriers (membrane, asphaltic, concrete, etc) used to control combustible gases generated by the landfill?

0.0%	1. Vents are used
0.0%	2. Barriers are used
1.3%	3. Use system other than vents and barriers
98.7%	4. No control used

C. Have special measures been taken to improve the aesthetics of the landfill site during its operating life?

1.3%	1. Yes, Planting
11.7%	2. Yes, Seeding
16.9%	3. Yes, 1 and 2, above
11.7%	4. Yes, but other than 1 and 2, above
58.4%	5. No

G. Off-Base Sanitary Landfills

As discussed previously, many installations dispose of their solid wastes in both on-base and off-base landfills (or other facilities). For example, while 63 installations do not have an on-base landfill and utilize off-base facilities, 85 reported use of an off-base landfill.

Only 1.2 percent (1 installation) of the installations using this disposal means did not know how much was being disposed of (versus 22.2 percent for on-base users; tipping fees likely forces more accurate accounting of wastes in an off-base situation). The median tonnage disposed of is in the range of 5 to 9.9 tons per day, which is below the median for on-base disposal. The reasons for the differences, when compared for generation rates, is not entirely clear, although they are related to dual on-base/off-base disposal, more accurate record keeping for off-base disposal, and the type and size of installations generating the solid wastes.

Table 20 tabulates off-base landfill disposal usage. As with on-base usage, approximately 92 percent of the off-base disposal sites received less than 50.0 tons per day from the Air Force. The off-base data is slightly distorted, however, by the fact that at least one installation (McClellan AFB) reported a final disposal site as being both a transfer station and an off-base sanitary landfill. For all practical purposes, this installation's waste is left for county disposal at the transfer station. From there, it is transported to the county landfill.

H. Life Expectancy - Off-Base Sanitary Landfills

Table 21 lists the life expectancies of off-base landfills. Over 50 percent had 10 or more years of remaining usefulness. Of these landfills 14.2 percent had 4 years or less remaining capacity. Eight of the 12 installations using these short-lived disposal facilities had selected another site or alternate means of disposal.

I. Off-Base Incinerators

Only three non-radar site installations (2.5 percent) sent their solid wastes to off-base incinerators. There were no on-base incinerators used as primary disposal facilities, although six installations did process solid wastes in this manner. The daily tonnages sent to the off-base incinerators were in the following respective ranges: 0 - 4.9 TPD; 5 - 9.9 TPD; and 25 - 29.9 TPD.

J. Solid Waste Transfer Stations

Seven non-radar site installations use transfer stations. Of these, four (Patrick, Hill, McClellan, and Chanute) use one or more on-base transfer facilities. The remaining three (Bolling, Hickam, and Los Angeles AFS) use one or more off-base transfer stations. One installation, Tyndall, had plans to use an on-base transfer facility during FY 77.

TABLE 20. FY 76 AVERAGE DAILY TONNAGE - OFF-BASE LANDFILLS (a)

<u>Tonnage</u>	<u>Number and Percentage of Installations</u>	
	<u>No.</u>	<u>Percent</u>
0 - 4.9	28	33.3
5 - 9.9	15	17.9
10 - 14.9	8	9.5
15 - 19.9	8	9.5
20 - 24.9	3	3.6
25 - 29.9	5	6.0
30 - 34.9	5	6.0
35 - 39.9	4	4.8
40 - 44.9	1	1.2
55 - 59.9	1 (Albrook)	1.2
60 - 64.9	1 (Peterson Field)	1.2
70 - 74.9	1 (Hickam)	1.2
80 - 84.9	1 (Andrews)	1.2
90 - 94.9	1 (Chanute)	1.2
Greater than 100.0	1 (Howard)	1.2

Median tonnage: 5 - 9.9

(a) Radar Sites not included.

TABLE 21. LIFETIME EXPECTANCY - OFF-BASE LANDFILLS (a)

<u>Expected Lifetime</u> ^(b)	<u>Percent of Installations Using Off-Base Landfills</u>
6 Months	1.2
*Cannon	
1 Year	3.5
*Dover Grissom	
*Homestead	
2 Years	4.7
*McGuire *Grandforks	
Pease *Los Angeles AFS	
3 Years	2.4
Columbus *Offutt	
4 Years	2.4
*Mt Hebo Eglin	
5 Years	10.6
6 Years	4.7
6-10 Years	20.0
Over 10 Years	50.6

(a) No Radar Sites included

(b) Installations with short term off-base landfills (4 years or less) are listed with their respective category.

* Other landfill site or alternate disposal means selected

(Tyndall later cancelled the project.) Table 22 lists the installations and their daily tonnages.

TABLE 22. FY 76 AVERAGE DAILY TONNAGE - TRANSFER STATIONS

I. <u>On-Base Facilities</u>		<u>Daily Tonnage</u>
Chanute		15 - 19.9
Patrick		20 - 24.9
Hill		25 - 29.9
McClellan		35 - 39.9
II. <u>Off-Base Facilities</u>		<u>Daily Tonnage</u>
Los Angeles AFS		0 - 4.9
Bolling		25 - 29.9
Hickam		40 - 44.9

McClellan AFB's transfer station is owned by the county, on land leased by the Air Force to the county. Anyone, government or private, can use the facility. Wastes are disposed of off-base.

K. Other Disposal Facilities

The installations were surveyed to determine if they used any disposal facility other than landfills, off-base incinerators and transfer stations. Nine installations (7.6 percent) use facilities other than material and/or energy recovery oriented. The installations were not queried to determine what their facilities were. Eight installations used material recovery facilities. They are: Hill, Wurtsmith, Robins, Edwards, Barksdale, Reese, Norton, and Chanute. No installations reported use of energy recovery disposal systems, or combined material and energy recovery disposal systems.

SECTION VIII

COLLECTION AND DISPOSAL COSTS

A. FY 76 Collection and Disposal Costs - Overview

The format of the survey did not permit an exact determination of solid waste management costs. Nonetheless, the data provides a relatively conservative and understated estimate of these costs.

For the 160 installations analyzed, the minimum total costs for FY 76 collection and disposal was almost \$17 million. Subtracting the 41 radar sites slightly reduces this figure to \$16.5 million. The understatement of this figure can be seen in Table 23; although the uppermost range for costs was \$325,000.00 plus, at least one logistics installation (Robins) indicated its total costs were \$581,997.00. In addition, the figures reported do not include significant additional costs incurred in the custodial waste gathering area. Over one-half of the non-radar site installations paid out \$130,000 or more for collection and disposal of their residential, commercial, and institution wastes. Table 24 provides data for selected commands; relative average and median installation costs are provided in this table and in Figure 3.

B. Collection Costs - Share of the Total

Most installations with contract services do not break out individual costs for the collection and disposal functions. This necessitated their working with the contractor to obtain needed estimates, or contacting disposal facility personnel for the information. Other installations used a proportionate share of the costs based on national averages; however, the number of installations doing this was small and should not unduly bias the data reported.

Collection costs averaged 74 percent of non-radar installations' total management costs for residential, commercial and institutional solid wastes. This falls within the national average of 70 to 85 percent (Reference 36). As Table 24 indicates, the collection proportion ranged from 54 percent for the AAC to 78 percent for SAC. The low percentage for AAC can be attributed to the fact that HQ AAC used a 60/40 collection to disposal cost ratio when calculating the estimated disposal cost for its many remote radar-sites.

One-half of the installations pay out \$100,000.00 or more per year for collection services. Of these installations, approximately 34 percent have costs in excess of \$200,000.00. At least one installation (Robins) reported a collection cost of almost \$500,000.00.

C. Residential Collection - Costs Per Ton

The collection costs on a per ton basis varies from \$0.99 or less

TABLE 23. TOTAL FY76 COLLECTION AND DISPOSAL COST FOR RESIDENTIAL/COMMERCIAL/INSTITUTIONAL SOLID WASTE

Minimum Total Cost = \$ 16,535,000.

Percentage responses per cost category (cost is in thousands of dollars)

0.0 - 4.0 = 1.7%	5.0 - 9.9 = 5.0%	10.0 - 14.9 = 4.2%	15.0 - 19.9 = 2.5%
20.0 - 24.9 = 2.5%	25.0 - 29.9 = 1.7%	35.0 - 39.9 = 1.7%	40.0 - 44.9 = 0.8%
45.0 - 49.9 = 2.5%	65.0 - 69.9 = 0.8%	70.0 - 74.9 = 0.8%	75.0 - 79.9 = 3.4%
80.0 - 84.9 = 4.2%	85.0 - 89.9 = 1.7%	95.0 - 99.9 = 4.2%	100.0 - 104.9 = 1.7%
105.0 - 109.9 = 0.8%	110.0 - 114.9 = 0.8%	115.0 - 119.9 = 2.5%	120.0 - 124.9 = 3.4%
125.0 - 129.9 = 0.8%	130.0 - 134.9 = 2.5%	135.0 - 139.9 = 0.8%	140.0 - 144.9 = 1.7%
145.0 - 149.9 = 3.4%	150.0 - 154.9 = 1.7%	160.0 - 164.9 = 2.5%	165.0 - 169.9 = .8%
175.0 - 179.9 = 1.7%	180.0 - 184.9 = 4.2%	185.0 - 189.9 = 1.7%	190.0 - 194.9 = 3.4%
195.0 - 199.9 = 1.7%	200.0 - 204.9 = 5.0%	210.0 - 214.9 = 0.8%	215.0 - 219.9 = 1.7%
225.0 - 229.9 = 0.8%	235.0 - 239.9 = 0.8%	240.0 - 244.9 = 1.7%	245.0 - 249.9 = 0.8%
255.0 - 259.9 = 1.7%	265.0 - 269.9 = 1.7%	275.0 - 279.9 = 0.8%	285.0 - 289.9 = 1.7%
300.0 - 304.9 = 0.8%	305.0 - 309.9 = 0.8%	320.0 - 324.9 = 0.8%	325.0 - **** = 5.9%

TABLE 24. FY76 COMMAND COST COMPARISONS (X 1,000)

	USAF (a)	USAF (b)	ADC	AAC	ATC	TAC	MAC/AFSC	SAC	AFLC
Minimum Total Costs	\$16,535	16,960	605	860	2,065	2,515	3,305	4,515	1,780
Minimum Total Collection Costs	12,235	12,460	440	465	1,545	1,840	2,490	3,520	1,180
Percent Costs For Collection	74%	73	73	54	75	73	75	78	66
Total Installations	119	160	38	17	15	18	22	28	7
Average Collection and Disposal Costs	\$138.9	106.0	15.9	50.6	137.7	139.7	150.0	161.2	254.3
Average Collection Cost	\$102.8	77.9	11.6	27.4	103.0	102.2	113.1	125.7	168.6
Median Collection and Disposal Costs	\$134.5	87.5	7.5	17.5	117.5	132.5	147.5	162.5	325.0 plus
Median Collection Costs	\$104.5	64.5	5.0	7.5	84.5	114.5	114.5	124.5	200.0 plus

(a) Without 41 Radar Sites

(b) With Radar Sites

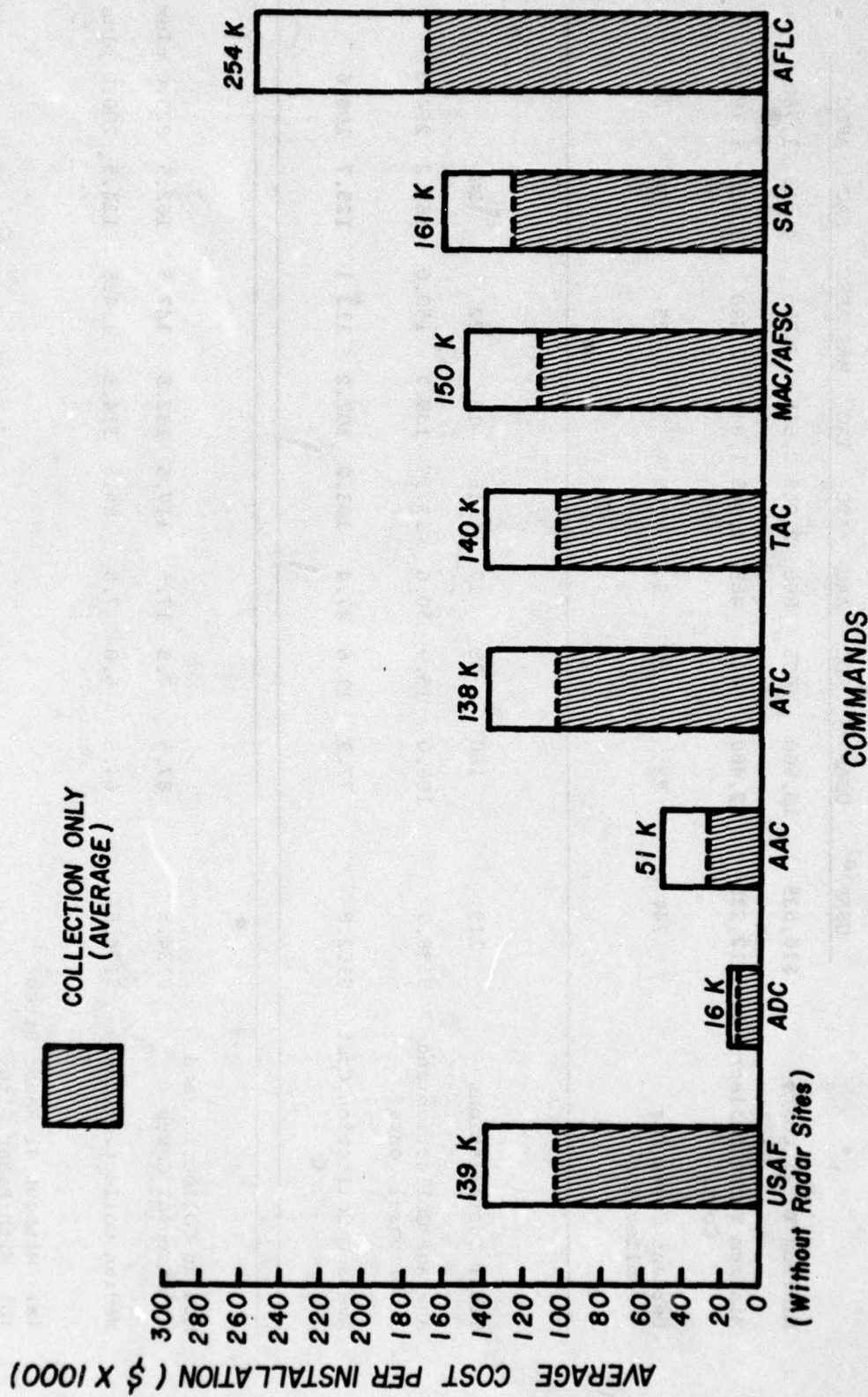


Figure 3. Comparison of Relative Average Refuse Management Costs

to over \$30.00 per ton. One installation (Robins) reported they paid \$73.64 per ton of waste collected.

As Tables 25 and 26 indicate, contractor collection is accomplished on a lower unit cost basis than using in-house services. For example, the median unit cost for contractor collection is \$22.00 to 23.99 per ton versus \$30.00 plus for in-house service. Whereas 29.8 percent of the installations with a contractor pay \$30.00 plus per ton for collection, 52.6 percent of the installations using in-house forces pay \$30.00 or more.

When viewed from the level of service, contractor curbside collection is accomplished at a lower unit cost than contractor non-curbside pickup, which confirms civilian experiences as discussed in Section IV. (The number of weekly pickups (2x) is about the same for both methods. The median unit cost for contractor curbside service is \$22 to 23.49 per ton versus \$26 to 27.99 for non-curbside pickup.)

Contractor curbside collection also appears to be cheaper than in-house curbside service, which has a median unit cost of \$30.00 plus. Interestingly, the situation is reversed for in-house operations: In-house non-curbside service has a median unit cost of \$22 to 23.99 per ton versus \$30.00 plus for in-house curbside service. Caution is necessary in drawing any real conclusions about the latter comparison because the number of installations with in-house non-curbside service is small (6) and less than one-half of those with curbside service (13). In addition, the number of weekly collections is higher for more installations with in-house curbside service than those with non-curbside pickup; this higher service level will usually cost more and may partly account for the high cost differences discussed. It will also explain some of the cost differences with contractor curbside collection which is predominately twice a week versus three or more times for the same in-house service.

D. Commercial-Institutional Collection - Costs Per Ton

As with residential collection, the cost per ton ranged from \$0.99 or less to over \$30.00 per ton (Reference Tables 27 and 28). The median unit cost for contractor commercial collection was the same as for contractor residential service, \$22.00 to 23.99 per ton. Contrary to residential collection, however, in-house services showed a slightly lower per unit cost than contractor operations; the in-house median cost unit was \$20.00 to \$21.99 per ton.

The level of service appeared to have little influence on the cost of collection. No installation used "on-call service only." Contractor and in-house "scheduled service only" had an identical median unit cost of \$22.00 to \$23.99 per ton. In-house combined on-call and scheduled service collection had a median unit cost of \$20.00 to 21.99 per ton versus \$22.00 to 23.99 for the same level of service by contractor operation. The unit costs reveal little data on why "scheduled service

TABLE 26. FY 76 RESIDENTIAL COLLECTION COSTS (DOLLARS/TON) - MEDIAN COST RANGES

I. Command:	USAF (without radar sites)	ADC	AAC	ATC	TAC	MAC/AFSC	SAC	AFLC	Radars Sites Only
II. Means of Accomplishment:									
A. Contractor									
No. of Bases	94	36	0	13	18	18	26	1	26
Total	\$22-24	\$24-26	-	\$19-20	\$20-21	\$26-28	\$24-26	\$30 plus	\$24-30 plus
Curbside/Back Alley	\$22-24	\$24-26	-	\$15-16	\$22-24	\$22-24	\$19-20	-	\$24-26
Non-Curbside/ Back Door	\$26-28	\$30 plus	-	\$19-20	\$13-14	\$30 plus	\$26-28	\$30 plus	\$30 plus
B. In-House									
No. of Bases	19	1	17	2	0	1	2	6	14
Total	\$30 plus	\$1-2	\$11-12	\$4-30 plus	-	\$30 plus	\$20-30 plus	\$30 plus	\$11-12
Curbside/ Back Alley	\$30 plus	-	\$13-30	\$30 plus(a)	-	\$30 plus	\$28-30	\$30 plus	-
Non-Curbside/ Back Door	\$14-15	\$1-2	\$10-11	\$4-6(a)	-	-	-	-	\$11-12

(a) One base

TABLE 28. FY 76 COMMERCIAL AND INSTITUTIONAL COSTS (DOLLARS/TON)
-MEDIAN COST RANGES-

I. Command:	USAF (Without radar sites)	ADC	AAC	ATC	TAC	MAC/AFSC	SAC	AFLC	Radar Sites Only
II. Means of Accomplishment									
A. Contractor Service									
No of bases	70	37	0	13	12	15	10	1	27
Total	\$22-24	\$24-26	-	\$17-18	\$24-26	\$22-24	\$28-30	\$3-4	\$26-28
On-Call Only	-	-	-	-	-	-	-	-	-
Scheduled	\$22-24	\$26-28	-	\$13-14	\$22-24	\$22-24	\$26-28	\$3-4	\$26-30 plus
Only									
Combined On- Call and Scheduled	\$22-24	\$20-21	-	\$17-18	\$24-30 plus	\$18-30 plus	\$28-30 plus	-	\$14-20
B. In-House									
No. of bases	49	1	17	2	6	7	18	6	14
Total	\$20-21	\$3-4	\$11-12	\$4-30 plus	\$18-19	\$18-19	\$24-26	\$20-30 plus	\$11-12
On-Call Only	-	\$3-4(a)	-	-	-	-	-	-	-
Scheduled	\$22-24	-	-	\$4-5	\$15-16	\$30 plus	\$16-17	\$30 plus	-
Only									
Combined On- Call and Scheduled	\$20-21	-	\$11-12	\$30 plus	\$18-19	\$18-19	\$28-30	\$20-21	\$11-12
(a) Radar site									

only" is a preferred level of service with contractor arrangement, and "combined service" is preferred with in-house operations as discussed in Section V.

E. FY 76 Disposal Costs - Total

For the 119 non-radar site installations surveyed, the minimum total disposal costs were almost \$3.60 million. (If the 41 radar sites are included, the costs increase slightly to \$3.76 million.) The median cost range was \$20,000 to 24,900 for disposal. The range was from \$4,900 or less to \$200,000 or more. Ten installations paid out \$80,000 or more; of these, two paid over \$200,000 in FY 76.

F. On-Base Landfill Disposal - Costs Per Ton

The median unit cost for on-base sanitary landfill disposal (55 installations) was \$6.00 to \$6.99 per ton. This falls within the national range of \$1.50 to \$8.00 per ton (Reference 37). The costs ranged from \$0.99 or less for three installations to \$30.00 or more for six installations. The unit disposal cost for the only installation using both an on-base landfill and a transfer station was \$0.00 to \$0.99 per ton.

G. Off-Base Landfill Disposal - Costs Per Ton.

The off-base landfill costs were divided into three categories: no transfer station(s) used; on-base transfer station used; and off-base transfer station used. These costs amount to tipping or dump fees.

For those installations without transfer stations the per unit cost ranged from \$0.00 to \$0.99 per ton to \$30.00 or more. In contrast to on-base landfill costs, off-base landfill use had a lower median unit cost of \$4.00 to \$4.99 per ton (versus on-base of \$6.00 to \$6.99).

Four installations used on-base transfer stations. Two of these incurred costs of \$0.00 to \$0.99 per ton. One paid \$2.00 to \$2.99 and the other paid \$3.00 to \$3.99 per ton.

Three installations used off-base transfer stations. The costs were scattered. One paid \$6.00 to \$6.99 per ton; another \$10.00 to \$10.99; and the other, \$30.00 plus.

H. Off-Base Incinerator Disposal - Costs Per Ton

Two installations used off-base transfer stations to transfer their solid wastes to an incinerator, which was considered a final disposal site by the installations. The costs per ton were \$0.00 to \$0.99 and \$10.00 to \$10.99, respectively.

For the one installation that hauled its solid waste directly to an incinerator, the disposal cost per ton was \$6.00 to \$6.99.

I. Transfer Stations - Costs Per Ton

Four installations used transfer stations as their final disposal site. The costs (tipping fees) were widely scattered; one installation incurred a cost of \$0.00 to \$0.99 per ton; the others paid \$5.00 to \$5.99, \$15.00 to \$15.99, and \$30.00 plus per ton, respectively.

SECTION IX

REFUSE RESOURCE RECOVERY

A. General

The policy of DOD is to recover solid wastes of value wherever economically feasible. In part, this policy is based upon Environmental Protection Agency (EPA) guidelines for mandatory recovery of materials and energy. Consequently, all installations were queried on past, present, and future recovery activities in order to provide a perspective on the extent and potential for USAF refuse resource recovery, particularly as it relates to the requirements and policy criteria of EPA and DOD.

B. Residential Newspaper Recycling - Potential

The number of residential family units serves as criteria for mandatory determination of the ability of an installation to sustain a newspaper recovery program. In effect, where more than 500 families (dwelling units) reside, the installation must recycle newspapers or use them as an energy resource, unless it is not economically feasible to do so. Where there are 500 or less families, such investigation is encouraged (References 38, 39, and 40).

The FY 76 survey revealed that 80 installations have more than 500 dwelling units. They are listed in Table 29. (Two of the installations have since been deactivated (Craig and Kincheloe AFBs) and are not listed.)

C. Residential Area Recycling - Past and Present

Eighty-one of the installations surveyed indicated that they did not, and have not had, a recycling program involving non-DOD surplus personal property (such as newspapers, beverage cans, and glass) from the residential areas on the installation. Twenty installations had a program which is no longer active, and 18 installations said that they had an active program. The latter are listed in Table 30.

For installations who have considered recycling but do not have or never had a residential recovery program, 54.0 percent reported that cost analysis showed that such a program was not feasible; 14.3 percent reported that cost analysis supported the concept but other factors denied implementation. The remaining 31.7 percent reported that they considered recycling but did not conduct a cost analysis to determine its viability.

For those installations with active or previous recovery programs, the following statements reflect some important characteristics of their recovery efforts:

TABLE 29. INSTALLATIONS WITH OVER 500 DWELLING UNITS

Command and Installation

Air University (AU)

Maxwell AFB

Tactical Air Command (TAC)

Bergstrom AFB
Cannon AFB
England AFB
Davis-Monthan AFB
George AFB
Holloman AFB
Homestead AFB
Luke AFB
MacDill AFB
Mt Home AFB
Myrtle Beach AFB
Nellis AFB
Seymour-Johnson AFB
Shaw AFB

AF Academy (AFA)

Air Force Academy

Strategic Air Command (SAC)

Andersen AFB
Barksdale AFB
Beale AFB
Blytheville AFB
Carswell AFB
Castle AFB
Dyess AFB
Ellsworth AFB
Fairchild AFB
Grand Forks AFB
Griffiss AFB
Grissom AFB
K. I. Sawyer AFB
Loring AFB
Malmstrom AFB
March AFB
McConnell AFB
Offutt AFB
Pease AFB

Command and Installation

Plattsburgh AFB
Rickenbacker AFB
Vandenberg AFB
Whiteman AFB
Wurtsmith AFB
Minot AFB

Aerospace Defense Command (ADC)

Peterson AFB
Tyndall AFB

AF Communications Service (AFCS)

Richards-Gebaur AFB

AF Logistics Command (AFLC)

Hill AFB
McClellan AFB
Robins AFB
Tinker AFB
Wright-Patterson AFB

Alaskan Air Command (AAC)

Eielson AFB
Elmendorf AFB

Military Airlift Command/Systems
Command (MAC/AFSC)

Charleston AFB
Little Rock AFB
Travis AFB
Altus AFB
Scott AFB
Andrews AFB
Bolling AFB
Dover AFB
McGuire AFB
McChord AFB
Edwards AFB
Eglin AFB
L. G. Hanscom AFB
Kirtland AFB
Patrick AFB

TABLE 29. INSTALLATIONS WITH OVER 500 DWELLING UNITS (CONCLUDED)

Command and Installation

Air Training Command (ATC)

Chanute AFB
Columbus AFB
Keesler AFB
Lackland AFB
Laughlin AFB
Lowry AFB
Mather AFB
Randolph AFB
Sheppard AFB
Williams AFB

Pacific Air Forces (PACAF)

Hickam AFB

Southern Command

Howard AFB

TABLE 30. INSTALLATIONS WITH ACTIVE NON-DOD
SURPLUS PROPERTY RECYCLING PROGRAMS*

COMMAND AND INSTALLATION

Tactical Air Command (TAC)

Davis-Monthan AFB
George AFB
Nellis AFB

AF Academy (AFA)

Air Force Academy

Strategic Air Command (SAC)

Fairchild AFB
Malmstrom AFB

AF Communications Service (AFCS)

Richards-Gebaur AFB

AF Logistics Command (AFLC)

Hill AFB
Robins AFB
Wright-Patterson AFB

Military Airlift Command/Systems Command (MAC/AFSC)

Bolling AFB
Edwards AFB
Kirtland AFB
L. G. Hanscom AFB

Air Training Command (ATC)

Chanute AFB
Lackland AFB
Lowry AFB

AF Reserve (AFRES)

Dobbins AFB

*Excludes Base Exchange and Commissary wastes.

1. Four of the installations did not consider their current programs successful from the standpoint of base citizen support and economics. Roughly 25 percent considered their program successful only from the standpoint of base citizen support. A slightly higher percentage believed that their program was successful only from an economics standpoint, and an equal number believed that their program was successful both economically and because of residential support.

2. A majority of the inactive and unsuccessful active programs relied on permanent in-house engineering personnel which were not adequate to support both primary mission functions and a recycling program.

3. A slight majority of currently active, successful programs used either contractor personnel or a combination of contractor and permanent in-house engineering personnel to support the program. These installations overwhelmingly indicated that in-house forces were inadequate to support both the mission and recycling activities.

4. A majority of the installations, whether they had active or inactive programs, indicated that they had conducted a study of the potentially recoverable materials available in their installation's solid waste stream.

5. Almost all installations had conducted waste material market studies before embarking on the program. Most studies were accomplished through a cooperative effort of both base Civil Engineering personnel and Defense Property Disposal Office (DPDO) staff. However, 12 out of 20 installations with inactive programs stated that the DPDO was interested but unsuccessful in locating markets. Similarly, 3 out of the 4 installations with currently unsuccessful programs had no success with DPDO locating markets. On the other hand, DPDO success in locating markets for recovered items appear to positively support programs currently termed successful.

6. A majority of the installations indicated that cost analysis had been conducted prior to program implementation to determine if the program would be economically feasible through capital returns and cost avoidance. (However, a significant number (40 percent) of installations with inactive programs did not conduct cost analyses.) In addition, 2 out of the 4 installations with currently unsuccessful programs failed to conduct a cost analysis.

7. Economic viability appeared to be a key factor in deciding to implement currently successful programs. On the other hand, implementation of past programs appeared to be strongly influenced by the good public image that they were perceived to convey.

8. A significant 75 percent of the installations with inactive programs reported that market constraints on material preparation before

sale impeded the sale of these materials. One-half of the installations with successful active programs and one-half of those with unsuccessful active programs also encountered material preparation constraint problems.

9. Curbside pickup only of recovered materials was practiced by only one installation. Most preferred on-base recycling centers or some other method separate, or in combination with, recycling centers and curbside pickup.

Seventy percent of the 20 installations that have inactive programs planned to reimplement a program after FY 77. Similarly, 71.3 percent of installations with no history of recycling planned to implement a program after FY 77.

D. Base Exchange and Commissary Waste Recycling

Cardboard recycling by installations is specifically addressed by the EPA and DOD directives referenced previously. In this regard, over one-half (54.6 percent) of the 119 installations surveyed recycle cardboard from their Base Exchanges and Commissaries. A small percentage (6.7 percent) recycle other wastes as well as cardboard from these activities. The remainder do not recycle cardboard.

E. Central Plant Steam Generation and Refuse Derived Fuel Use

One of the more promising, but underdeveloped, means of refuse resource recovery involves co-firing of refuse derived fuel (RDF) with fossil fuels in large steam generating boilers. Co-firing with coal appears to be the most practical, near term application of RDF. Co-firing with oil is also being investigated. Consequently, installations were asked to provide some very general data on their steam generating systems that would provide a perspective on the current use of RDF in USAF boiler systems and the type of fuel-use systems that will have to be considered in any future program to promote wider spread utilization of RDF as a supplemental fuel.

Table 31 provides a summary of survey responses. Over one-half (56.1 percent) of existing steam plants (excluding radar sites) use natural gas as a basic fuel, and most of these also have the capability to burn oil. Only 10 out of 82 installations with central steam plants burn coal as a primary fuel. Only Wright-Patterson AFB can utilize RDF in their coal-fired boiler system. Duluth IAP is planning to use RDF in FY 77. Four other installations (Pope, Kirtland, Charleston, and Chanute AFB) are planning to develop the capability to burn RDF in their boilers beyond FY 77.

The use of RDF as a supplemental or primary fuel may be promoted beyond what these survey responses indicate because Congress has emphasized the goals of reducing DOD dependence on oil and natural gas, con-

TABLE 31. CENTRAL PLANT STEAM GENERATION AND RDF USE^(a)

I. Basic Fuel Used

<u>Fuel</u>	<u>Number of Installations</u>	<u>Percent of Total</u>
A. Oil	26	31.7
B. Coal	10	12.2
C. Natural Gas	46	56.1
D. Refuse Derived Fuel (RDF)	0	0.0
E. Other	0	0.0
Total	82	100.0

II. Fuels That Can Be Utilized

<u>Fuel</u>	<u>Number of Installations</u>	<u>Percent of Total</u>
A. Oil	19	23.2
B. Coal	6	7.3
C. Natural Gas	8	9.8
D. Refuse Derived Fuel (RDF)	0	0.0
*E. RDF and one or more of the above	1	1.2
F. Oil and Coal	4	4.9
G. Oil and Natural Gas	43	52.4
H. Coal and Natural Gas	1	1.2
I. Oil, Coal and Natural Gas	0	0.0
J. Other	0	0.0
Total	82	100.0

*Wright-Patterson AFB

(a) Excludes Radar Sites

verting to coal, and increased use of RDF within the DOD (Reference 41).

F. Use of Waste Heat Recovery Incinerators

The use of incinerators to process solid wastes and recover the heat is another area of refuse energy recovery potential. As Table 32 indicates, only McConnell AFB used a waste heat recovery incinerator. Eleven installations planned to use such incinerators in either FY 77 or FY 78.

G. Regional Refuse Resource Recovery

DOD policy for resource recovery includes the utilization of joint or regional civilian community recovery facilities/systems, whenever possible (Reference 42). Within this context, installations were asked if they resided in a region which has, or is planning to have refuse material and/or energy resource recovery. The results are tabulated in Table 33. At least 37 installations are in regions in which some form of refuse materials and/or energy recovery is in operation or being developed.

Installations were also asked if they were planning to be, or already were involved with civilian local or regional solid waste management systems which include some phase of materials and/or energy recovery.

Almost 75 percent (89 installations) indicated that they had no involvement. Twenty-five installations indicated that they were in the planning stage, and five indicated that they were already involved. (See Table 34 for the listing of specific installations.)

In the absence of civilian programs and a locally available commercial recycling industry, DOD and EPA policy require federal establishment of resource recovery facilities under the conditions stated below:

DOD facilities located within a Standard Metropolitan Statistical Area (SMSA) are required to participate with other DOD Components and Federal facilities in the establishment and/or utilization of a single resource recovery facility if: (1) any one Federal facility generate 50 tons or more of residential, commercial, and institutional solid waste per day after complying with waste reduction and source separation policies; and (2) the combined total of this solid waste for all Federal facilities within the SMSA is 100 tons per day. The Federal Agency having jurisdiction over a Federal facility that generates the largest quantity of residential, commercial and institutional solid waste in the SMSA will be designated the lead agency in the planning, programming, and budgeting for the resource recovery facility in accordance with EPA Guidelines" (Reference 43).

The installations located in a SMSA were identified by the survey and are listed in Appendix E.

TABLE 32. USE OF SOLID WASTE HEAT RECOVERY INCINERATORS

I. Installations with the capability

McConnell AFB

II. Installations planning to expand the capability

None

III. Installations without the capability but planning to have it during FY 77.

Bolling AFB

Barksdale AFB

IV. Installations without the capability but planning to have it beyond FY 77.

Air Force Academy

Hancock AFB

Andrews AFB

Langley AFB

Carswell AFB

Rickenbacker AFB

Charleston AFB

Scott AFB

Eglin AFB

TABLE 33. INSTALLATIONS IN REGIONS WITH REFUSE RESOURCE
RECOVERY PLANS OR OPERATION (a)

I. Installations located in region with resource recovery operations:

<u>Installation</u>	<u>County/State</u>	<u>SMSA</u>
Malstrom AFB	Cascade/MT	Great Falls, MT
Vandenberg AFB	Santa Barbara/CA	Santa Barbara, CA
Niagara Falls IAP	Niagara/NY	Buffalo, NY

II. Installations located in region where resource recovery operations are being built:

Gen Mitchell Field	Milwaukee/WI	Milwaukee, WI
--------------------	--------------	---------------

III. Installations located in region which are planning resource recovery operations:

Dover AFB	Kent/DE	None
Wheeler AFB	Honolulu/HI	Honolulu, HI
Eglin AFB	Okaloosa/FL	None
MacDill AFB	Hillsborough/FL	Tampa-St Petersburg, FL
Griffiss AFB	Oneida/NY	Utica-Rome, NY
Homestead AFB	Dade/FL	Miami, FL
Ellsworth AFB	Pennington/SD	None
Scott AFB	St. Clair/IL	St. Louis, IL
Wright-Patterson AFB	Greene-Montgomery/OH	Dayton/OH
Patrick AFB	Brevard/FL	Melbourne-Titusville-Cocoa, FL
Bergstrom AFB	Travis/TX	Austin, TX
Tyndall AFB	Bay/FL	None
Cheyenne Mountain	El Paso/CO	Colorado Springs, CO
Elmendorf AFB	Anchorage/AK	Anchorage, AK
Mather AFB	Sacramento/CA	Sacramento, CA
Norton AFB	San Bernardino/CA	Riverside-San Bernardino-Ontario, CA
Charleston AFB	Charleston/SC	Charleston-North Charleston, SC
Andrews AFB	Prince George/MD	Washington, DC
Langley AFB	Hampton/VA	Newport News-Hampton, VA
Air Force Academy	El Paso/CO	Colorado Springs, CO
K. I. Sawyer	Marquette/MI	None
Lowry AFB	Denver/CO	Denver-Boulder, CO

(a) Radar Sites excluded

TABLE 33. INSTALLATIONS IN REGIONS WITH REFUSE RESOURCE
RECOVERY PLANS OR OPERATION (CONCLUDED)

<u>Installation</u>	<u>County/State</u>	<u>SMSA</u>
Richards-Gebaur AFB	Jackson-Cass/MO	Kansas City, MO
L. G. Hanscom AFB	Middlesex/MA	Boston, MA
McClellan AFB	Sacramento/CA	Sacramento, CA
Hickam AFB	Honolulu/HI	Honolulu, HI
Mt Hebo	Tillamook-Yamhill/OR	None
Pope AFB	Cumberland/NC	Fayetteville, NC
Sheppard AFB	Wichita/TX	Wichita Falls, TX
March AFB	Riverside/CA	Riverside-San Bernardino-Ontario, CA
Kelly AFB	Bexar/TX	San Antonio, TX
Youngstown Arpt	Mahoning/OH	Youngstown-Warren, OH
Chanute AFB	Champaign/IL	Champaign-Urbana-Rantol, IL

(Total = 33 installations)

IV. Twenty-two installations did not know if their regions were involved in refuse resource recovery.

TABLE 34. INSTALLATIONS PLANNING OR INVOLVED WITH
LOCAL/REGIONAL REFUSE RESOURCE RECOVERY (a)

I. Installations involved with local/regional resource recovery:

Grissom AFB	Mather AFB	Davis Montham AFB
Chanute AFB	Beale AFB	

II. Installations planning involvement with local/regional
resource recovery:

Dover AFB	Langley AFB	Pope AFB
Elmendorf AFB	Norton AFB	Scott AFB
Wright-Patterson AFB	Hickam AFB	Eglin AFB
MacDill AFB	Lowry AFB	Gen Mitchell Field
McClellan AFB	Wheeler AFB	Tyndall AFB
Malstrom AFB	Richards-Gebaur AFB	L.G. Hanscom AFB
Tinker AFB	Bergstrom AFB	AFA
K. I. Sawyer AFB	Kelly AFB	Vandenberg AFB
Blytheville AFB		

(a) Radar Sites excluded

SECTION X

RADAR SITE SOLID WASTE CHARACTERISTICS

A. Daily Waste Generation

Forty one installations reported their primary function/activity as Radar Sites. Of these, 92.7 percent (38 sites) reported a daily generation of between 0.0 and 4.9 tons of residential, commercial, and institutional solid waste. This compares significantly to the 17.6 percent of non-radar sites reporting daily tonnages in this range. The lowest known generation was 0.04 TPD; the highest was between 50 to 54.9 TPD (Reference 12). Residential waste generation data could not be accurately identified, because radar sites usually only have dormitories whose wastes are not separately collected from the rest of the site.

B. Sludges, Street Sweepings, Demolition, and Ground Wastes

Thirty-five of the 41 installations reported daily generation of these wastes in the range of 0.0 to 4.9 tons per day. The remaining six installations did not know how much they generated.

C. Residential Collection Practices

Over one-half (57.5 percent) of the 40 installations with residential areas do not make separate collections for bulky "white goods" items. Most of the remainder (40.0 percent) pick up these items on an on-call basis.

All radar sites belonging to the AAC (13 installations) use in-house resources to collect their residential solid wastes. All provide a non-curbide/back door level of service. A majority (52.5 percent) of the radar sites use contractors and curbide/back alley service.

Collection frequency varies among the sites. Twenty-five percent utilize once a week service; 35.0 percent use twice a week service; and 43.0 percent use three or more pickups per week. Sites utilizing contractor services usually collect wastes 2 or less times per week, whereas those with in-house forces usually collect 3 or more times weekly. The latter use the same collection schedules and resources to collect their commercial and institutional wastes.

None of the installations had any plans to change their collection arrangements and levels of service.

D. Commercial-Institutional Collection Practices

All sites appear to use the same collection arrangement in the commercial-institutional areas as they do in their residential areas. In a reflection of the non-radar site collection frequencies, most

installations with contractor services collect their commercial-institutional solid wastes on a scheduled basis. On the other hand, in-house collections primarily involve a combination of scheduled and on-call pickups; none use scheduled pickups only. No radar site planned any changes in the near future.

E. Processing of Waste

Approximately 32 percent of the sites utilize incineration to process their solid wastes from all sources. (This contrasts to the 3.6 percent for non-radar site installations.) All of these sites belong to the AAC. Of the installations, 48.8 percent do not process their residential waste; 56.1 percent do not process their commercial-institutional waste. No site planned to increase its processing capabilities in FY 77.

F. Disposal Practices

Thirteen of the 41 radar sites use on-base sanitary landfills. Sites using in-house service normally used the on-base disposal facility. The average daily disposed tonnage is in the range of 0 to 4.9 tons. All on-base landfills have life expectancies of 6 or more years. Most exclude infectious wastes; almost all have no exclusion criteria for other wastes.

Almost all sites using contractors dispose off-base. Twenty-six sites use off-base landfills; 85.2 percent of these installations dispose of from 0.0 to 4.9 tons per day in the landfills. Approximately 4.0 percent did not know what their daily disposal quantity was. Only two off-base landfills used by the sites had 4 or less years remaining life-time; however, both of the sites involved had selected another landfill site or alternate means of disposal.

Two sites use off-base incinerators as their final disposal destination. One site (Blaine AFS) reported that it used both an incinerator and an off-base landfill; the landfill is used whenever the incinerator is not operating. None use transfer stations as a final disposal site.

G. Collection and Disposal Costs

Approximately 54 percent of the sites paid \$10,000 or less in FY 76 for collection and disposal; 96.2 percent paid less than \$25,000. Altogether, sites paid at least \$425,000 for their FY 76 collection and disposal operations. Contrary to a 70 plus percent share of the total cost with non-radar site installations, radar site collection accounted for only about 50 percent of the FY 76 solid waste management budget.

The collection costs on a unit basis varies from \$0.99 or less to over \$30.00 per ton, for both residential and commercial-institutional solid wastes. The median unit cost for contractor residential collection is \$30.00 plus per ton, compared to the non-radar site contractor residential collection cost of \$22.00 to \$23.99 per ton. The median in-house radar site residential unit collection cost is \$11.00 to \$11.99 per ton versus \$30.00 plus for non-radar site in-house collections.

The median unit cost for contractor commercial collection is \$26.00 to \$27.99 per ton; for in-house commercial collection the cost was \$11.00 to \$11.99. Scheduled collection only, which is the most common contractor pickup method, has a median unit cost of \$28.00 to \$29.99 per ton. The most common in-house collection method is combined on-call and scheduled service with a median unit cost of \$11.00 to \$11.99.

The median unit cost for on-base sanitary landfill (mainly remote AAC sites) is \$15.00 to \$15.99 per ton. Off-base landfill median unit cost is \$7.00 to \$7.99 per ton. The two sites utilizing off-base incinerators paid \$7.00 to \$7.99 and \$24.00 to \$25.99 per ton, respectively.

H. Refuse Resource Recovery

No radar site had over 500 family dwelling units that would have required them to automatically study the feasibility of newspaper recycling. One installation indicated that it had a non-appropriated fund recycling program that was now inactive. There were no active programs. Forty of the sites planned to implement a recycling program after FY 77.

Oil is the primary fuel used in radar site central steam plants. None planned to develop a capability for using refuse derived fuel. Similarly, no site presently has or plans to utilize refuse waste heat recovery incinerators.

One installation (New Hampshire Satellite Tracking Station) is located in a region in which refuse material and/or energy recovery is in operation. The region encompassing Lockport AFS is building a facility for refuse resource recovery; and Ft Fisher, North Bend, and North Charleston are in regions planning refuse resource recovery. Ft Fisher and New Hampshire Satellite Tracking Station are actively involved in their region's refuse resource recovery systems or planning. Eight sites did not know of their region's status.

Only Lockport AFS, Mill Valley, and North Charleston are located in Standard Metropolitan Statistical Areas.

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APPENDIX A

1976

US AIR FORCE

SOLID WASTE MANAGEMENT SURVEY

ENVIRONMENTAL STATUS REPORT

RCS: DD-H&E (A) 1269

PARTICIPATING INSTALLATIONS

<u>Code</u>	<u>Installation</u>	<u>Code</u>	<u>Installation</u>
AA	Campion AFS	CA	Opheim
AB	Cape Lisburne	CB	Peterson Fld
AC	Cape Newenham	CC	Point Arena
AD	Cape Romanzof	CD	Port Austin
AE	Eielson	CE	Roanoke Rapids
AF	Elmendorf	CF	Saratoga
AG	Ft Yukon	CG	Sault Ste Marie
AH	Galena Apt	CH	St Albans
AI	Indian Mountain	CI	Tyndall
AJ	Murphy Dome	CJ	Watertown
AK	Shemya	DA	AFA
AL	Tatalina	EA	AF AFC
AM	Tin City	FA	Maxwell
BA	Almaden	FB	Gunter
BB	Antigo	GA	Chanute
BC	Baudette	GB	Columbus
BD	Blaine	GC	Craig
BE	Calumet	GD	Keesler
BF	Cambria	GE	Lackland
BG	Cape Charles	GF	Laughlin
BH	Caswell	GG	Lowry
BI	Charleston AFS	GH	Mather
BJ	Cheyenne Mt	GI	Moody
BK	Clear	GJ	Randolph
BL	Duluth IAP	GK	Reese
BM	Empire	GL	Sheppard
BN	Ent	GM	Vance
BO	Finland	GN	Webb
BP	Finley	HO	Williams
BQ	Fortuna	HA	Richards-Gebaur
BR	Ft Fisher	IA	Gentile AFS
BS	Ft Lee, VA	IB	Hill
BT	Gibbsboro	IC	Kelly
BU	Hancock	ID	McClellan
BV	Havre	IE	Newark AFS
BW	Kalispell	IF	Robins
BX	Kingsley	IG	San Antonio AFS
BY	Klamath	IH	Tinker
BZ	Lockport	II	Wright-Patterson
BO	Mill Valley	IJ	Oklahoma AFS
B1	Minot AFS	JA	Arnold EDC
B2	Montauk	JB	Brooks
B3	Mt Hebo	JC	Edwards
B4	Mt Laguna	JD	Eglin
B5	North Bend	JE	Kirtland
B6	North Charleston	JF	LG Hanscom
B7	North Truro		

PARTICIPATING INSTALLATIONS (Concluded)

<u>Code</u>	<u>Installation</u>	<u>Code</u>	<u>Installation</u>
JG	Los Angeles AFS	PB	Bergstrom
JH	Patrick	PC	Cannon
JI	Sunnyvale AFS	PD	England
KA	Andrews	PE	George
KB	Bolling	PF	Gila Bend
LA	Altus	PG	Holloman
LB	Charleston AFB	PH	Homestead
LC	Dover	PI	Indian Springs
LD	Little Rock	PJ	Langley
LE	McChord	PK	Luke
LF	McGuire	PL	MacDill
LG	Norton	PM	Mt Home
LH	Pope	PN	Myrtle Beach
LI	Scott	PO	Nellis
LJ	Travis	PP	Seymour-Johnson
MA	Hickam	PQ	Shaw
MB	Wheeler	QA	Goodfellow
NA	Albrook	RA	Buckley
NB	Howard	RB	Selfridge
OA	Andersen	RC	Ontario IAP
OB	Barksdale	SA	Chicago/O'Hare IAP
OC	Beale	SB	Dobbins
OD	Blytheville	SE	Gen Mitchell Fld
OE	Carswell	SF	Hamilton
OF	Castle	SG	Minn/St Paul IAP
OG	Davis Monthan	SH	Niagara Falls IAP
OH	Dyess	SI	Westover
OI	Ellsworth	SJ	Youngstown MPT
OJ	F E Warren	AN	Cold Bay AFS
OK	Fairchild	AO	King Salmon Aprt
OL	Grand Forks	AP	Kotzebue AFS
OM	Griffiss	AQ	Sparrevohn AFB
ON	Grissom	JJ	N H Satellite Track- ing Station
OO	K I Sawyer	PR	Hurlburt Fld
OP	Kincheloe		
OQ	Loring		
OR	Malmstrom		
OS	March		
OT	McConnell		
OU	Minot AFB		
OV	Offutt		
OW	Pease		
OX	Plattsburgh		
OY	Rickenbacker		
OZ	Vandenberg		
Ol	Whiteman		
O2	Wurtsmith		
PA	Avon Park		

1. Using the codes with the list of installations on page iii, what is the first code letter for your installation?

- | | | |
|------|------|------|
| a. A | h. H | n. N |
| b. B | i. I | o. O |
| c. C | j. J | p. P |
| d. D | k. K | q. Q |
| e. E | l. L | r. R |
| f. F | m. M | s. S |
| g. G | | |

2. Using the codes with the list of installations on page one, what is the second code letter for your installation?

- | | | | | |
|------|------|------|------|------|
| a. A | h. H | o. O | v. V | 2. 2 |
| b. B | i. I | p. P | w. W | 3. 3 |
| c. C | j. J | q. Q | x. X | 4. 4 |
| d. D | k. K | r. R | y. Y | 5. 5 |
| e. E | l. L | s. S | z. Z | 6. 6 |
| f. F | m. M | t. T | 0. 0 | 7. 7 |
| g. G | n. N | u. U | 1. 1 | |

3. In support of the overall Air Force Defense mission, how would you best describe the primary function/activity on your installation?

- | | |
|---------------------------------|--------------------------|
| a. Flying Operations | g. R&D Laboratory/Center |
| b. Flying Training | h. Flight Test Center |
| c. Industrial/Logistics Support | i. Test Range |
| d. Technical/Academic Training | j. Missile Operations |
| e. Medical Services | k. Ground/Basic Training |
| f. Administrative/Headquarters | l. Radar Sites |

4. How would you best describe the secondary function/activity on your installation?

- | | |
|---------------------------------|--------------------------|
| a. Flying Operations | g. R&D laboratory/center |
| b. Flying Training | h. Flight Test Center |
| c. Industrial/Logistics Support | i. Test Range |
| d. Technical/Academic Training | j. Missile Operations |
| e. Medical Services | k. Ground/Basic Training |
| f. Administrative/Headquarters | l. Radar Site |

5. How many dwelling units (i.e., number of families) are there on your installation?

- | | |
|----------------------------------|---------------------|
| a. 500 or less | b. Greater than 500 |
| c. We have no residential areas. | |

6. What was the average daily tonnage of solid wastes collected from all residential, commercial and institutional sources during Fiscal year 76? (Include quantities of waste materials collected for recycling, regardless of who collects or processes it). Average daily tonnage should be based on annual tonnage averaged over a 260 day period. Do not include industrial solid wastes.

- | | | |
|----------------|------------|-------------------|
| a. 0- 4.9 Tons | h. 35-39.9 | o. 70-74.9 |
| b. 5- 9.9 | i. 40-44.9 | p. 75-79.9 |
| c. 10-14.9 | j. 45-49.9 | q. 80-84.9 |
| d. 15-19.9 | k. 50-54.9 | r. 85-89.9 |
| e. 20-24.9 | l. 55-59.9 | s. 90-94.9 |
| f. 25-29.9 | m. 60-64.9 | t. 95-99.9 |
| g. 30-34.9 | n. 65-69.9 | u. 100 or greater |

7. What was the FY 76 average daily tonnages of collected wastewater treatment sludges, street sweepings, construction/demolition wastes and grounds maintenance wastes?

- | | |
|------------|------------------|
| a. 0- 4.9 | e. 20-24.9 |
| b. 5- 9.9 | f. 25 or greater |
| c. 10-14.9 | g. Do not know |
| d. 15-19.9 | |

8. What was the average FY 76 daily tonnage of solid waste collected in your base residential areas? Average daily tonnage should be based on annual tonnage averaged over a 260 day period.

- | | | |
|------------|------------|----------------------------------|
| a. 0- 4.9 | e. 20-24.9 | i. 40-44.9 |
| b. 5- 9.9 | f. 25-29.9 | j. 45-49.9 |
| c. 10-14.9 | g. 30-34.9 | k. 50 or greater |
| d. 15-19.9 | h. 35-39.9 | l. We have no residential areas. |

9. Are residential bulky, "white good" type items picked up separately from routine collection?

- a. Yes, on a fixed schedule
- b. Yes, on an on-call basis
- c. No
- d. We have no residential areas
- e. Combination of a and b above

10. What method of collection is used in your base residential areas?

- a. Contractor, with curbside/back alley service
- b. Contractor, with non-curbside/back door service
- c. In-house, with curbside/back alley service
- d. In-house, with non-curbside/back door service
- e. We have no residential areas.

11. How many pickups per week are made for routine collection in your base residential areas?

- a. 1
- b. 2
- c. 3
- d. More than 3
- e. Some combination of the above.
- f. We have no residential areas.

12. Are there plans to change your current method of residential area collection during FY 77?

- a. No
- b. Yes, to contractor with curbside/back alley service
- c. Yes, to contractor with non-curbside/back door service
- d. Yes, to in-house with curbside/back alley service
- e. Yes, to in-house with non-curbside/back door service
- f. Undecided, but considering it
- g. We have no residential areas.

13. What method of collection is used in your commercial and institutional areas?

- a. Contractor, with on-call pickups
- b. Contractor, with scheduled pickups
- c. Contractor, with combination of on-call and scheduled pickups
- d. In-house, with on-call pickup
- e. In-house, with scheduled pickups
- f. In-house, with combination of on-call and scheduled pickups.

14. Are there plans to change your current method of commercial and institutional collection during FY 77?

- a. Yes
- b. Undecided, but considering it
- c. No

15. Does contractor dispose of solid waste on-base?

- a. Yes, residential contractor onlh
- b. Yes, commercial and institutional area contractor only
- c. Yes, both residential and commercial-institutional contractor
- d. No
- e. No, we have no contractors

16. What type of processing is used in managing residential area solid waste? (Do not include compaction capability of collection vehicle).

- | | |
|-----------------|--------------------------------|
| a. Compaction | e. Other |
| b. Baling | f. Two or more of the above |
| c. Incineration | g. None |
| d. Shredding | h. We have no residential area |

17. What type of processing is used in managing commissary solid waste?

- | | |
|-----------------|-----------------------------|
| a. Compaction | e. Other |
| b. Baling | f. Two or more of the above |
| c. Incineration | g. None |
| d. Shredding | h. We have no commissary |

18. What type of processing is used in managing Base Exchange solid waste?

- | | |
|-----------------|-----------------------------|
| a. Compaction | e. Other |
| b. Baling | f. Two or more of the above |
| c. Incineration | g. None |
| d. Shredding | h. We have no Base Exchange |

19. What type of processing is used in managing commercial and institutional solid waste, other than the commissary and Base Exchange activities?

- | | |
|-----------------|-----------------------------|
| a. Compaction | e. Other |
| b. Baling | f. Two or more of the above |
| c. Incineration | g. None |
| d. Shredding | |

20. Do you have plans to increase your solid waste processing capabilities in FY 77?

- a. Yes, in residential areas only
- b. Yes, in commercial and institutional areas only
- c. Yes, in residential, commercial and institutional areas.
- d. Undecided, but considering it
- e. No.

21. What was the average FY 76 daily tonnage of solid waste disposed of in your on-base sanitary landfill? (Average daily tonnage is defined in questions on collection.) "On-base" also includes Air Force responsible landfill which may be physically located outside the actual boundary of the base.

- | | | |
|----------------|------------|--------------------------|
| a. 0- 4.9 Tons | i. 40-44.9 | q. 80-84.9 |
| b. 5- 9.9 | j. 45-49.9 | r. 85-89.9 |
| c. 10-14.9 | k. 50-54.9 | s. 90-94.9 |
| d. 15-19.9 | l. 55-59.9 | t. 95-99.9 |
| e. 20-24.9 | m. 60-64.9 | u. 100 or greater |
| f. 25-29.9 | n. 65-69.9 | v. Do not know |
| g. 30-34.9 | o. 70-74.9 | w. Our waste does not go |
| h. 35-39.9 | p. 75-79.9 | into an on-base sani- |
| | | tary landfill. |

22. Does any other Air Force installation, off-base federal or nonfederal agency/organization utilize your on-base sanitary landfill?

- a. Yes, other Air Force installation(s) only
- b. Yes, off-base federal agency(ies) only.
- c. Yes, non-federal organization(s) only
- d. Yes, both other Air Force and Off-base federal agency (ies) only
- e. Yes, both other Air Force and non-federal organization(s) only.
- f. Yes, both other federal and non-federal organization(s) only
- g. Yes, other Air Force, federal and non-federal organizations
- h. No
- i. We do not have an on-base sanitary landfill

23. Do the above pay your installations for use of the on-base sanitary landfill?

- a. Yes
- b. No
- c. Some pay and some don't
- d. None of the above utilize our on-base sanitary landfill
- e. We do not have an on-base sanitary landfill.

24. If other Air Force installations, off-base federal or non-federal organizations pay a "tipping/dumping" fee (\$ ton) for use of your on-base sanitary landfill, does it amount to (use average, if paid by more than one user):

- | | | |
|--------------|----------------|------------------------|
| a. 0.1 -0.99 | k. 10.00-10.99 | u. 20.00-21.99 |
| b. 1.00-1.99 | l. 11.00-11.99 | v. 22.00-23.99 |
| c. 2.00-2.99 | m. 12.00-12.99 | w. 24.00-25.99 |
| d. 3.00-3.99 | n. 13.00-13.99 | x. 26.00-27.99 |
| e. 4.00-4.99 | o. 14.00-14.99 | y. 28.00-29.99 |
| f. 5.00-5.99 | p. 15.00-15.99 | z. 30.00 or greater |
| g. 6.00-6.99 | q. 16.00-16.99 | Ø. No tipping fee paid |
| h. 7.00-7.99 | r. 17.00-17.99 | 1. None of the above |
| i. 8.00-8.99 | s. 18.00-18.99 | utilize our on-base |
| j. 9.00-0.99 | t. 19.00-19.99 | sanitary landfill |
| | | 2. We have no on-base |
| | | sanitary landfill |

25. What is the estimated remaining life expectancy of your active on-base sanitary landfill?

- | | |
|----------------|----------------------------------|
| a. Six months | f. Five years |
| b. One year | g. Six years |
| c. Two years | h. Between six and ten years |
| d. Three years | i. More than 10 years |
| e. Four years | j. Our waste does not go into an |
| | on-base sanitary landfill |

26. If the estimated life of the on-base sanitary landfill is four years or less, do you have another landfill site selected or an alternate means of disposal?

- Yes
- No
- Our wastes do not go to an on-base sanitary landfill
- Estimated life time is greater than four years.

27. Do you exclude construction, demolition, and industrial wastes from your on-base sanitary landfill?

- Yes
- We exclude only construction and demolition materials
- We exclude only industrial wastes.
- No. We accept all of the wastes described in this question
- We do not have an on-base sanitary landfill

28. Do you exclude infectious wastes from your on-base sanitary landfill?

- Yes
- No
- We do not have an on-base sanitary landfill

29. Do you exclude sludges and liquid wastes from your on-base sanitary landfill?

- a. Yes
- b. We exclude sludges only
- c. We exclude liquid wastes only
- d. No, we accept both
- e. We do not have an on-base sanitary landfill

30. What was the average FY 76 daily tonnage of solid wastes disposed of in off-base landfill(s)?

- | | | |
|------------|------------|-------------------------|
| a. 0- 4.9 | i. 40-44.9 | Q. 80-84.9 |
| b. 5- 9.9 | j. 45-49.9 | r. 85-89.9 |
| c. 10-14.9 | k. 50-54.9 | s. 90-94.9 |
| d. 15-19.9 | l. 55-59.9 | t. 95-99.9 |
| e. 20-24.9 | m. 60-64.9 | u. 100 or greater |
| f. 25-29.9 | n. 65-69.9 | v. Do not know |
| g. 30-34.9 | o. 70-74.9 | w. Our wastes do not go |
| h. 35-39.9 | p. 75-79.9 | into off-base landfills |

31. What is the estimated remaining life expectancy of the landfill use off-base? (If more than one landfill is used, give average of their expected lifetimes.)

- | | |
|----------------|---------------------------------------|
| a. Six months | g. Six years |
| b. One year | h. Between six and ten years |
| c. Two years | i. More than ten years |
| d. Three years | j. Our wastes do not go into off-base |
| e. Four years | landfills |
| f. Five years | |

32. If the estimated life of the off-base landfill(s) is four years or less, do you have another landfill site selected or an alternate means of disposal?

- a. Yes
- b. No
- c. Our wastes do not go to an off-base landfill
- d. Estimated life time is greater than four years

33. What was the average FY 76 daily tonnage of solid wastes disposed of in off-base incinerator site(s)?

- | | | |
|------------|------------|--------------------------|
| a. 0- 4.9 | i. 40-44.9 | q. 80-84.9 |
| b. 5- 9.9 | j. 45-49.9 | r. 85-59.9 |
| c. 10-14.9 | k. 50-54.9 | s. 90-94.9 |
| d. 15-19.9 | l. 55-59.9 | t. 95-99.9 |
| e. 20-24.9 | m. 60-64.9 | u. 100 or greater |
| f. 25-29.9 | n. 65-69.9 | v. Do not know |
| g. 30-34.9 | o. 70-74.9 | w. Our wastes do not go |
| h. 35-39.9 | p. 75-79.9 | to off-base incinerators |

34. Do you use solid waste transfer stations?

- a. No
- b. No, but we plan to use on-base transfer stations during FY 77
- c. No, but we plan to use off-base transfer stations during FY 77
- d. Yes, we use one or more on-base transfer stations
- e. Yes, we use one or more off-base transfer stations

35. What was the average FY 76 daily tonnage of solid waste handled through transfer station(s)?

- | | | |
|------------|------------|--------------------------------|
| a. 0- 4.9 | i. 40-44.9 | q. 80-84.9 |
| b. 5- 9.9 | j. 45-49.9 | r. 85-89.9 |
| c. 10-14.9 | k. 50-54.9 | s. 90-94.9 |
| d. 15-19.9 | l. 55-59.9 | t. 95-99.9 |
| e. 20-24.9 | m. 60-64.9 | u. 100 or greater |
| f. 25-29.9 | n. 65-69.9 | v. Do not use transfer station |
| g. 30-34.9 | o. 70-74.9 | |
| h. 35-39.9 | p. 75-79.9 | |

36. Do you utilize some other type of disposal facility other than or in addition to landfills, off-base incinerators and transfer stations?

- a. Yes, and it is material recovery oriented
- b. Yes, and it is energy recovery oriented
- c. Yes, and it is both material and energy recovery oriented
- d. Yes
- e. No

37. How is residential area solid waste disposed of?

- a. Contractor, with on-base disposal
- b. Contractor, with off-base disposal
- c. In-house, with on-base disposal
- d. In-house, with off base disposal
- e. Combination of the above
- f. We have no residential area

38. How is commercial and institutional solid waste disposed of?

- a. Contractor, with on-base disposal
- b. Contractor, with off-base disposal
- c. In-house, with on-base disposal
- d. In-house with off-base disposal
- e. Combination of the above.

39. What was your total FY 76 collection and disposal costs for residential, commercial and institutional solid waste? (Include "storage" and "processing," sanitary landfill, etc., costs)

- | | | |
|------------------|--------------------|--------------------|
| a. \$0-4,999 | m. 60,000-64,999 | y. 120,000-124,999 |
| b. 5,000-9,999 | n. 65,000-69,999 | z. 125,000-129,999 |
| c. 10,000-14,999 | o. 70,000-74,999 | Ø. 130,000-134,999 |
| d. 15,000-19,999 | p. 75,000-79,999 | 1. 135,000-139,999 |
| e. 20,000-24,999 | q. 80,000-84,999 | 2. 140,000-144,999 |
| f. 25,000-29,999 | r. 85,000-89,999 | 3. 145,000-149,999 |
| g. 30,000-34,999 | s. 90,000-94,999 | 4. 150,000-154,999 |
| h. 35,000-39,999 | t. 95,000-99,999 | 5. 155,000-159,999 |
| i. 40,000-44,999 | u. 100,000-104,999 | 6. 160,000-164,999 |
| j. 45,000-49,999 | v. 105,000-109,999 | 7. None above; see |
| k. 50,000-54,999 | w. 110,000-114,999 | following question |
| l. 55,000-59,999 | x. 115,000-119,999 | |

40. Question 39 continued: Total FY 76 collection and disposal cost

- | | | |
|--------------------|--------------------|--------------------|
| a. Answered above | m. 220,000-224,999 | y. 280,000-284,999 |
| b. 165,000-169,999 | n. 225,000-229,999 | z. 285,000-289,999 |
| c. 170,000-174,999 | o. 230,000-234,999 | Ø. 290,000-294,999 |
| d. 175,000-179,999 | p. 235,000-239,999 | 1. 295,000-299,999 |
| e. 180,000-184,999 | q. 240,000-244,999 | 2. 300,000-304,999 |
| f. 185,000-189,999 | r. 245,000-249,999 | 3. 305,000-309,999 |
| g. 190,000-194,999 | s. 250,000-254,999 | 4. 310,000-314,999 |
| h. 195,000-199,999 | t. 255,000-259,000 | 5. 315,000-319,999 |
| i. 200,000-204,999 | u. 260,000-264,999 | 6. 320,000-324,999 |
| j. 205,000-209,999 | v. 265,000-264,999 | 7. 325,000-greater |
| k. 210,000-214,999 | w. 270,000-274,999 | |
| l. 215,000-219,999 | x. 275,000-279,999 | |

41. What was your total FY 76 collection cost for residential, commercial and institutional solid waste? (Include "storage" and "processing" costs).

- | | | |
|------------------|--------------------|-----------------------|
| a. \$0-4,999 | j. 45,000-49,999 | s. 130,000-139,999 |
| b. 5,000-9,999 | k. 50,000-59,999 | t. 140,000-149,999 |
| c. 10,000-14,999 | l. 60,000-69,999 | u. 150,000-159,999 |
| d. 15,000-19,999 | m. 70,000-79,999 | v. 160,000-169,999 |
| e. 20,000-24,999 | n. 80,000-89,999 | w. 170,000-179,999 |
| f. 25,000-29,999 | o. 90,000-99,999 | x. 180,000-189,999 |
| g. 30,000-34,999 | p. 100,000-109,999 | y. 190,000-199,999 |
| h. 35,000-39,999 | q. 110,000-119,999 | z. 200,000 or greater |
| i. 40,000-44,999 | r. 120,000-129,999 | |

42. What was your FY 76 dollar per ton (\$/ton) collection cost for residential solid wastes?

- | | | |
|-----------------|----------------|--------------------------------|
| a. \$0-0.99/ton | j. 9.00-9.99 | s. 18.00-18.99 |
| b. 1.00-1.99 | k. 10.00-10.99 | t. 19.00-19.99 |
| c. 2.00-2.99 | l. 11.00-11.99 | u. 20.00-21.99 |
| d. 3.00-3.99 | m. 12.00-12.99 | v. 22.00-23.99 |
| e. 4.00-4.99 | n. 13.00-13.99 | w. 24.00-25.99 |
| f. 5.00-5.99 | o. 14.00-14.99 | x. 26.00-27.99 |
| g. 6.00-6.99 | p. 15.00-15.99 | y. 28.00-28.99 |
| h. 7.00-7.99 | q. 16.00-16.99 | z. 30.00 or greater |
| i. 8.00-8.99 | r. 17.00-17.99 | Ø. We have no residential area |

43. What was your FY 76 dollar per ton (\$/ton) collection cost for commercial and institutional solid waste?

- | | | |
|--------------|----------------|---------------------|
| a. \$0-0.99 | j. 9.00-9.99 | s. 18.00-18.99 |
| b. 1.00-1.99 | k. 10.00-10.99 | t. 19.00-19.99 |
| c. 2.00-2.99 | l. 11.00-11.99 | u. 20.00-21.99 |
| d. 3.00-3.99 | m. 12.00-12.99 | v. 22.00-23.99 |
| e. 4.00-4.99 | n. 13.00-13.99 | w. 24.00-25.99 |
| f. 5.00-6.99 | o. 14.00-14.99 | x. 26.00-27.99 |
| g. 6.00-6.99 | p. 15.00-15.99 | y. 28.00-29.99 |
| h. 7.00-7.99 | q. 16.00-16.99 | z. 30.00 or greater |
| i. 8.00-8.99 | r. 17.00-17.99 | |

44. What was your total FY 76 disposal costs for residential, commercial and institutional solid waste?

- | | | |
|------------------|--------------------|-----------------------|
| a. \$0-4,999 | j. 45,000-49,999 | s. 130,000-139,999 |
| b. 5,000-9,999 | k. 50,000-59,999 | t. 140,000-149,999 |
| c. 10,000-14,999 | l. 60,000-69,999 | u. 150,000-159,999 |
| d. 15,000-19,999 | m. 70,000-79,999 | v. 160,000-169,999 |
| e. 20,000-24,999 | n. 80,000-89,999 | w. 170,000-179,000 |
| f. 25,000-29,999 | o. 90,000-99,999 | x. 180,000-189,999 |
| g. 30,000-34,999 | p. 100,000-109,999 | y. 190,000-199,999 |
| h. 35,000-39,999 | q. 110,000-119,999 | z. 200,000 or greater |
| i. 40,000-44,999 | r. 120,000-129,999 | z. 200,000 or greater |

45. What was your FY 76 dollar per ton (\$/ton) cost for on-base sanitary landfill disposal of residential, commercial and institutional solid waste? (Include cost of transfer station, if used between collection and final disposition in the landfill)

- | | | |
|--------------|----------------|-------------------------|
| a. \$0-0.99 | k. 10.00-10.99 | u. 20.00-21.99 |
| b. 1.00-1.99 | l. 11.00-11.99 | v. 22.00-23.99 |
| c. 2.00-2.99 | m. 12.00-12.99 | w. 24.00-25.99 |
| d. 3.00-3.99 | n. 13.00-13.99 | x. 26.00-27.99 |
| e. 4.00-4.99 | o. 14.00-14.99 | y. 28.00-29.99 |
| f. 5.00-5.99 | p. 15.00-15.99 | z. 30.00 or greater |
| g. 6.00-6.99 | q. 16.00-16.99 | Ø. Our wastes do not go |
| h. 7.00-7.99 | r. 17.00-17.99 | into on-base sanitary |
| i. 8.00-8.99 | s. 18.00-18.99 | landfills |
| j. 9.00-9.99 | t. 19.00-19.99 | |

46. What was your FY 76 dollar per ton (\$/ton) cost for off-base sanitary landfill disposal of residential, and commercial and institutional solid waste? (Include cost of transfer station if used between collection and final disposition in the landfill)

- | | | |
|--------------|----------------|-------------------------|
| a. \$0.-0.99 | k. 10.00-10.99 | u. 20.00-21.99 |
| b. 1.00-1.99 | l. 11.00-11.99 | v. 22.00-23.99 |
| c. 2.00-2.99 | m. 12.00-12.99 | w. 24.00-25.99 |
| d. 3.00-3.99 | n. 13.00-13.99 | x. 26.00-27.99 |
| e. 4.00-4.99 | o. 14.00-14.99 | y. 28.00-29.99 |
| f. 5.00-5.99 | p. 15.00-15.99 | z. 30.00 or greater |
| g. 6.00-6.99 | q. 15.00-15.99 | Ø. Our wastes do not go |
| h. 7.00-7.99 | r. 17.00-17.99 | into off-base sanitary |
| i. 8.00-8.99 | s. 18.00-19.99 | landfills |
| j. 9.00-9.99 | t. 19.00-19.99 | |

47. If incineration is considered your final disposal location, what was your FY 76 dollar per ton (\$/ton) cost for off-base incineration disposal of residential, commercial and institutional solid waste? (Include cost of transfer station if used between collection and final disposition in the incinerator).

- | | | |
|--------------|----------------|--------------------------|
| a. \$0-0.99 | k. 10.00-10.99 | u. 20.00-21.99 |
| b. 1.00-1.99 | l. 11.00-11.99 | v. 22.00-23.99 |
| c. 2.00-2.99 | m. 12.00-12.99 | w. 24.00-25.99 |
| d. 3.00-3.99 | n. 13.00-13.99 | x. 26.00-27.99 |
| e. 4.00-4.99 | o. 14.00-14.99 | y. 28.00-29.99 |
| f. 5.00-5.99 | p. 15.00-15.99 | z. 30.00 or greater |
| g. 6.00-6.99 | q. 16.00-17.99 | Ø. Our wastes do not go |
| h. 7.00-7.99 | r. 17.00-17.99 | to off-base incinerators |
| i. 8.00-8.99 | s. 18.00-18.99 | |
| j. 0.00-9.99 | t. 19.00-19.99 | |

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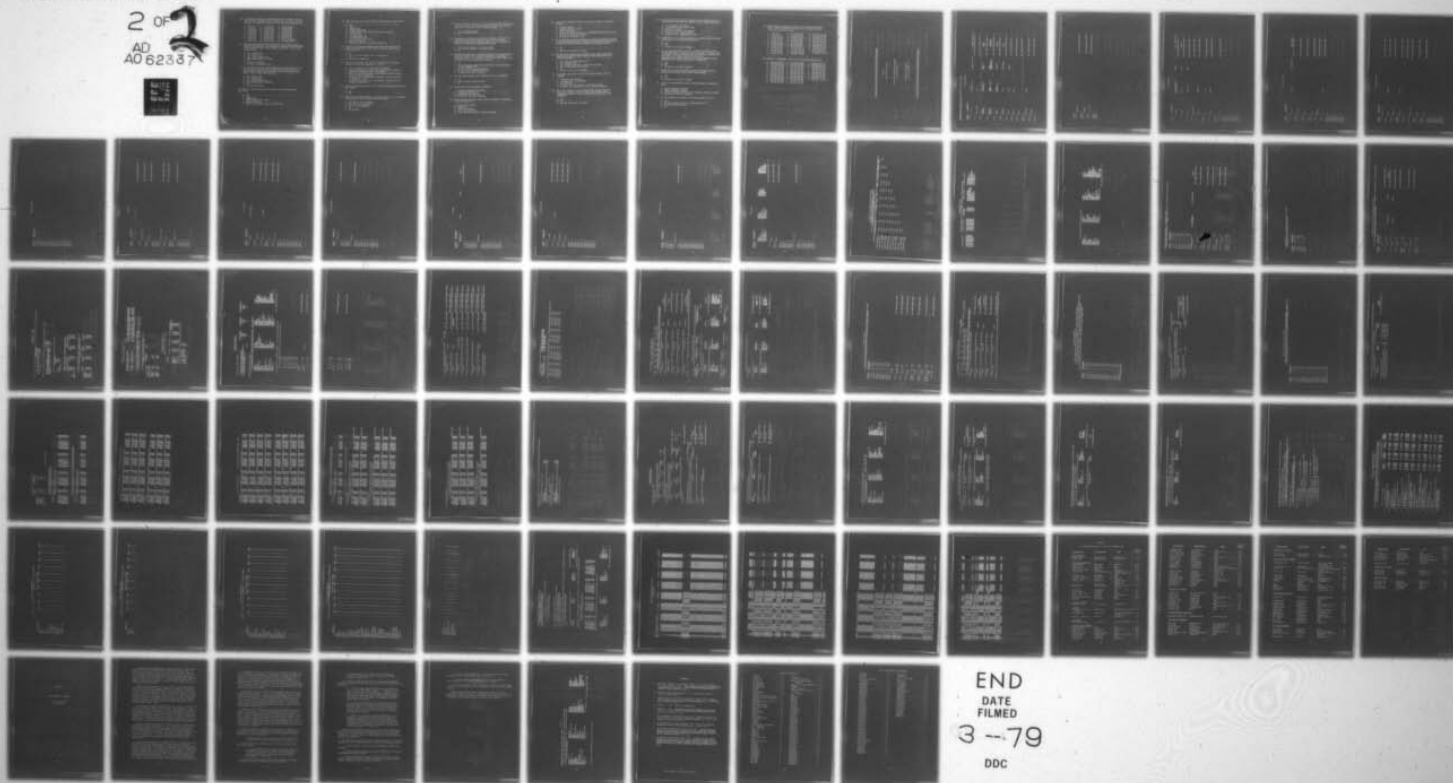
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48. If transfer stations are considered your final disposal location, what was your corresponding FY 76 dollar per ton (\$/ton) cost for disposal of residential, commercial and institutional solid waste?

- | | | |
|--------------|----------------|---------------------|
| a. \$0-0.99 | j. 9.00-9.99 | s. 18.00-18.99 |
| b. 1.00-1.99 | k. 10.00-10.99 | t. 10.00-19.99 |
| c. 2.00-2.99 | l. 11.00-11.99 | u. 20.00-21.99 |
| d. 3.00-3.99 | m. 12.00-12.99 | v. 22.00-23.99 |
| e. 4.00-4.99 | n. 13.00-13.99 | w. 24.00-25.99 |
| f. 5.00-5.99 | o. 14.00-14.99 | x. 26.00-27.99 |
| g. 6.00-6.99 | p. 15.00-15.99 | y. 28.00-29.99 |
| h. 7.00-7.99 | q. 16.00-16.99 | z. 30.00 or greater |
| i. 8.00-8.99 | r. 17.00-17.99 | Ø. Not applicable |

49. For your non-recycling related residential solid waste contract, does the base guarantee the contractor a specified minimum tonnage/volume per month and/or dollar payment per month? ("Put or pay" type contract.)

- a. Yes, tonnage only
- b. Yes, volume only
- c. Yes, dollar payment only
- d. Some combination of the above
- e. No
- f. We have no contract
- g. We have no residential area

50. For your non-recycling related commercial and institutional solid waste contract, does the base guarantee the contractor a specified minimum tonnage/volume per month and/or dollar payment per month? ("Put or pay" type contract)

- a. Yes, tonnage only
- b. Yes, volume only
- c. Yes, dollar payment only
- d. Some combination of the above
- e. No
- f. We have no contract

51. What is the basic fuel used for on-base central plant steam generation?

- a. Oil
- b. Coal
- c. Natural Gas
- d. Refuse Derived Fuel (RDF)
- e. None of the above
- f. We have no central steam plant facilities

52. What fuels can you utilize in your on-base central steam plants?
- a. Oil
 - b. Coal
 - c. Natural Gas
 - d. Refuse derived fuel
 - e. Refuse derived fuel and one or more of the above
 - f. Oil and coal
 - g. Oil and natural gas
 - h. Coal and natural gas
 - i. Oil, coal and natural gas
 - j. None of the above
 - k. We have no central steam plant facilities
53. If you do not have the capability to burn Refuse Derived Fuel (RDF) in your boilers, do you plan to create a capability to do so in FY 77?
- a. No
 - b. No, but we are planning for it beyond FY 77
 - c. Yes
 - d. We have the capability
54. Do you utilize waste heat recovery incinerators, or are you planning to have this capability in FY 77?
- a. Yes, we utilize one or more such incinerators
 - b. Yes, we utilize one or more such incinerators and plan to expand our capability in FY 77 or beyond
 - c. No, we do not utilize such incinerators and have no future plans for such a capability
 - d. No, we do not utilize such incinerators, but plan for such a capability in FY 77
 - e. No, we do not utilize such incinerators, but plan for the capability beyond FY 77
55. Is your installation located in a Standard Metropolitan Statistical Area (SMSA)?
- a. Yes
 - b. No
56. Does your installation reside in a region which has, or is planning refuse material and/or energy resource recovery?
- a. Yes, and it is in operation
 - b. Yes, and it is being built
 - c. Yes, it is in planning
 - d. No
 - e. Do not know.

57. Are you presently planning to be or already involved with civilian, local or regional solid waste management systems which include some phase of materials and/or energy recovery?
- Yes, in planning stage
 - Yes, already involved
 - No
58. Excluding Base Exchange and Commissary wastes, is there or has there been a recycling program on your installation that involves non-DOD surplus personal property (i.e., property not originally purchased with appropriated funds)?
- Yes, and the program is currently active
 - Yes, but the program is no longer active
 - No
59. If there has never been a recycling program on your installation involving non-DOD surplus personal property and Exchange/Commissary wastes, is it because cost analysis study showed such a program to be not economically feasible?
- Yes
 - No, cost analysis supported the concept, but other factors denied implementation
 - No cost analysis was accomplished
 - We have never considered recycling
 - We have or had such a program
60. Does the Base Exchange and/or Commissary recycle cardboard?
- Yes
 - Yes, and other wastes as well
 - No
61. Is/was your recycling program operated by:
- In-house engineering personnel
 - Contractor personnel
 - Combination of the above
 - We have not had such a program
62. Do you believe that the current recycling program is successful from the standpoint of:
- Base citizen support
 - Economics
 - Both of the above
 - It is not successful
 - We do not have a current recycling program

63. Is/was your residential (MFH) area recycling effort accomplished through:

- a. Curbside pickup
- b. On-base recycling centers
- c. Both of the above
- d. Some other method separate or in combination with a and b above
- e. We have not had such a program
- f. We have no residential area

64. If you have/had a recycling program, did Civil Engineering, DSA/DPDO or any other organization do a study of the potentially recoverable materials available in the installation solid waste stream?

- a. Yes
- b. No
- c. We have not had such a program

65. Did base Civil Engineering, DSA/DPDO or any other organization conduct waste material market studies before embarking on the recycling program?

- a. Yes, base Civil Engineering only
- b. Yes, DSA/DPDO only
- c. Yes, another organization other than the above
- d. Yes, a combination of the above
- e. No
- f. We have not had such a program

66. If DSA/DPDO was asked to assist in locating markets, was its response:

- a. Interested and successful
- b. Interested but non-successful
- c. Non-interested
- d. We didn't ask, but had/have a recycling program
- e. We didn't ask, and have not had a recycling program

67. Was a cost analysis study conducted before establishing the recycling program to indicate whether the program would be economically feasible either through capital returns or cost avoidance?

- a. Yes
- b. No
- c. We have not had such a program

68. If a cost analysis study was conducted which revealed that the program was not economically feasible, was it implemented because:

- a. It was marginally feasible
- b. It presented a good public image
- c. Both of the above
- d. We didn't conduct a cost analysis
- e. We have not had such a program
- f. Program is/was economically feasible

69. Do/did market constraints on material preparation before purchase impede sale of your recyclable materials?

- a. Yes
- b. No
- c. We have not had such a program

70. For all recycling efforts on base, including DSA/DPDO handled surplus DOD personal property: do/did recycling of materials such as cardboard from the Commissary and Base Exchange, aluminum cans from clubs, and computer paper/cards from data processing areas depend entirely on the base recycling program (without which the materials would be landfilled)?

- a. Yes
- b. No
- c. We have not had such a program

71. Is/was Civil Engineering manning adequate to support both the recycling program and normal mission requirements?

- a. Yes
- b. No
- c. We have not had such a program

72. Is/was Civil Engineering recycling program support accomplished with:

- a. Mainly permanent personnel
- b. Mainly temporary overhires
- c. Even split between permanent and temporary overhire personnel
- d. We have not had such a program

73. Are you planning to implement a recycling program in FY 77?

- a. Yes
- b. No, but we have plans for a program beyond FY 77
- c. We have an active program
- d. No

74. What was your installation's total FY 76 janitorial/custodial cost? (Include in-house janitorial cost (if known) and all contractual janitorial costs)

- | | | |
|------------------|--------------------|--------------------|
| a. \$0-4,999 | m. 60,000-64,999 | y. 120,000-124,999 |
| b. 5,000-9,999 | n. 65,000-69,999 | z. 125,000-129,999 |
| c. 10,000-14,999 | o. 70,000-74,999 | Ø. 130,000-134,999 |
| d. 15,000-19,999 | p. 75,000-79,999 | 1. 135,000-139,999 |
| e. 20,000-24,999 | q. 80,000-84,999 | 2. 140,000-144,999 |
| f. 25,000-29,999 | r. 85,000-89,999 | 3. 145,000-149,000 |
| g. 30,000-34,999 | s. 90,000-94,999 | 4. 150,000-154,999 |
| h. 35,000-39,999 | t. 95,000-99,999 | 5. 155,000-159,999 |
| i. 40,000-44,999 | u. 100,000-104,999 | 6. 160,000-164,999 |
| j. 45,000-49,999 | v. 105,000-109,999 | 7. None above; see |
| k. 50,000-54,999 | w. 110,000-114,999 | following question |
| l. 55,000-59,999 | x. 115,000-119,999 | |

75. Question 74 continued: Total FY 76 Janitorial/custodian cost

- | | | |
|--------------------|--------------------|-----------------------|
| a. answered above | m. 220,000-224,999 | y. 280,000-284,999 |
| b. 165,000-169,999 | n. 225,000-229,999 | z. 285,000-289,999 |
| c. 170,000-174,999 | o. 230,000-234,999 | Ø. 290,000-294,999 |
| d. 175,000-179,999 | p. 235,000-239,999 | 1. 295,000-299,999 |
| e. 180,000-184,999 | q. 240,000-244,999 | 2. 300,000-304,999 |
| f. 185,000-189,999 | r. 245,000-249,999 | 3. 305,000-309,999 |
| g. 190,000-194,999 | s. 250,000-254,999 | 4. 310,000-314,999 |
| h. 195,000-199,999 | t. 255,000-259,999 | 5. 315,000-319,999 |
| i. 200,000-204,999 | u. 260,000-264,999 | 6. 320,000-324,999 |
| j. 205,000-209,999 | v. 265,000-269,999 | 7. 325,000 or greater |
| k. 210,000-214,999 | w. 270,000-274,999 | |
| l. 215,000-219,999 | x. 275,000-279,999 | |

JOINT INVESTIGATION FINDER *

JOINT INVESTIGATION FINDER *

.....

APPENDIX B

UNITED STATES AIR FORCE

SOLID WASTE MANAGEMENT SURVEY RESULTS

FOR FISCAL YEAR 1976

ENVIRONMENT STATUS REPORT

RCS: DD-HSE(A)1269

JOINT INVESTIGATION FINDER *

.....

JOINT INVESTIGATION FINDER *

FLYING OPERATIONS

AVG DAILY TONNAGE	INSTALLATIONS RESPONDING
1000	1
100	1
50	1
25	1
10	1
5	1
2	1
1	1
0	1

0-492

KINGSLEY

5-9,9 =

MYATLE REACH

10-14.9

LANGLEY
ENGLAND
PLYTHEVILLE

15-19.9 =

BERGSTROM
POPE
MCCONNELL

20-24.9

COVER
LORING

25-29.9

BRISSEN
FATISCHLO

30-34.9 =

TRAVIS

35-39.9

ACCORD

40-44,9

NORTON

45-49,9

50-54.9 =

3105801 F

55-59.9 - 2

KINCHLOE

50-64.9 =

NIAGRA FALLS IAP

GREATER PITTS. FLD.
TOTAL INSTALLATIONS LISTED = 4

TOTAL INSTALLATIONS LISTED = 2

**CARSWELL
PEASE**

TOTAL INSTALLATIONS LISTED = 9

MOODY
RICKENBACKER
CHARLESTON AFB

TOTAL INSTALLATIONS LISTED = 11

ANDERSON

TOTAL INSTALLATIONS LISTED = 6

PLATTSBURGH

TOTAL INSTALLATIONS LISTED = 5

MCGUIRE

TOTAL INSTALLATIONS LISTED = 3

TOTAL INSTALLATIONS LISTED = 2

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 2

TOTAL INSTALLATIONS LISTED = 1

65-69.9 =		
70-74.9 =	ELMENDORF	TOTAL INSTALLATIONS LISTED = 1
75-79.9 =		
80-84.9 =	ANDREWS	TOTAL INSTALLATIONS LISTED = 1
85-89.9 =	K I SAWYER	TOTAL INSTALLATIONS LISTED = 1
90-94.9 =		
95-99.9 =		
100-*** =		

FLYING TRAINING

AVG DAILY INSTALLATIONS TONNAGE	INSTALLATIONS RESPONDING				
0- 4.9 =	STLA REVD AVON PARK	CHICAGO/DIAHRE IAP INDIAN SPRINGS	DOBBINS	GEN. MITCHELL FIELD	TOTAL INSTALLATIONS LISTED = 6
5- 9.9 =	WILLIAMS AFM	CRAIG	ALTUS	LAUGHLIN	TOTAL INSTALLATIONS LISTED = 5
10-14.9 =	GEORGE	TYNDALL AFB	REESE		TOTAL INSTALLATIONS LISTED = 3
15-19.9 =	DAVIS-MONTHAN				TOTAL INSTALLATIONS LISTED = 1
20-24.9 =	COLUMBUS	HOMESTEAD			TOTAL INSTALLATIONS LISTED = 2
25-29.9 =					
30-34.9 =	VANCE	LUKE			TOTAL INSTALLATIONS LISTED = 2
35-39.9 =	MACOILL	RANDOLPH			TOTAL INSTALLATIONS LISTED = 2
40-44.9 =					
45-49.9 =					
50-54.9 =	NELLIS				TOTAL INSTALLATIONS LISTED = 1
55-59.9 =					
60-64.9 =					
65-69.9 =					
70-74.9 =					
75-79.9 =					
80-84.9 =					
85-89.9 =					
90-94.9 =					
95-99.9 =					
100-*** =					

INDUS/LOGIS SUPPORT

AVG DAILY TONNAGE

0-4.9 =
5-9.9 =

WHEELER

10-14.9 =
15-19.9 =

NWARK AFS

20-24.9 =
25-29.9 =

TINKER

30-34.9 =
35-39.9 =

KELLY

40-44.9 =
45-49.9 =

MCCLELLAN

HILL

50-54.9 =
55-59.9 =
60-64.9 =
65-69.9 =
70-74.9 =
75-79.9 =
80-84.9 =
85-89.9 =
90-94.9 =
95-99.9 =
100-**** =

HANCOCK

KING SALMON APT

GALENA AIRPORT

TOTAL INSTALLATIONS LISTED = 4

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 2

ROBINS

TECH/ACADMC TRAINING

AVG DAILY INSTALLATIONS
TONNAGE RESPONDING

0- 4.9 =

GUNTER AFB

TOTAL INSTALLATIONS LISTED = 1

5- 9.9 =

MATHER

GOODFELLOW

TOTAL INSTALLATIONS LISTED = 2

10-14.9 =

MAXWELL AFB

TOTAL INSTALLATIONS LISTED = 1

15-19.9 =

20-24.9 =

SHEPPARD

LOWRY AFB

TOTAL INSTALLATIONS LISTED = 2

25-29.9 =

AFA

TOTAL INSTALLATIONS LISTED = 1

30-34.9 =

KEESLER AFB

TOTAL INSTALLATIONS LISTED = 1

35-39.9 =

40-44.9 =

ALBROOK

TOTAL INSTALLATIONS LISTED = 1

45-49.9 =

50-54.9 =

CHANUTE

TOTAL INSTALLATIONS LISTED = 1

55-59.9 =

60-64.9 =

65-69.9 =

70-74.9 =

75-79.9 =

80-84.9 =

85-89.9 =

90-94.9 =

95-99.9 =

100-**** =

MEDICAL SERVICES

AVG DAILY TONNAGE

INSTALLATIONS RESPONDING

0-4.9	=
5-9.9	=
10-14.9	=
15-19.9	=
20-24.9	=
25-29.9	=
30-34.9	=
35-39.9	=
40-44.9	=
45-49.9	=
50-54.9	=
55-59.9	=
60-64.9	=
65-69.9	=
70-74.9	=
75-79.9	=
80-84.9	=
85-89.9	=
90-94.9	=
95-99.9	=
100-****	=

ADMIN/HQT RS

AVG DAILY INSTALLATIONS
TONNAGE RESPONDING

0- 4.9 =

LOS ANGELES AFS

5- 9.9 =

10-14.9 =

RICHARDS-GERAUP

15-19.9 =

20-24.9 =

PATRICK

25-29.9 =

30-34.9 =

35-39.9 =

40-44.9 =

45-49.9 =

WRIGHT-PATTERSON

50-54.9 =

HOLLING

55-59.9 =

60-64.9 =

65-69.9 =

PETERSON FIELD

70-74.9 =

75-79.9 =

80-84.9 =

85-89.9 =

90-94.9 =

95-99.9 =

100-*** =

TOTAL INSTALLATIONS LISTED = 2

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

R & D LAB/CENTR

CHEYENNE MOUNTAIN

TOTAL INSTALLATIONS LISTED = 2

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 2

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

AVG DAILY INSTALLATIONS TONNAGE RESPONDING

0- 4.9 =

BROOKS

5- 9.9 =

10-14.9 =

ARNOLD EDC

15-19.9 =

GRIFFISS

20-24.9 =

25-29.9 =

FGLIN

30-34.9 =

KIRTLAND

35-39.9 =

40-44.9 =

45-49.9 =

50-54.9 =

55-59.9 =

60-64.9 =

65-69.9 =

70-74.9 =

75-79.9 =

80-84.9 =

85-89.9 =

90-94.9 =

95-99.9 =

100-*** =

FLIGHT TEST CENTER

AVG DAILY INSTALLATIONS TONNAGE RESPONDING

0- 4.9 = SUNNYVALE AFS

5- 9.9 =
10-14.9 =
15-19.9 =
20-24.9 =
25-29.9 =
30-34.9 =

EDWARDS

35-39.9 =
40-44.9 =
45-49.9 =
50-54.9 =
55-59.9 =
60-64.9 =
65-69.9 =
70-74.9 =
75-79.9 =
80-84.9 =
85-89.9 =
90-94.9 =
95-99.9 =
100-**** =

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TEST RANGE

AVG. DAILY INSTALLATIONS
TONNAGE RESPONDING

CAPE CHARLES
SARATOGA

ALMADEN

MT MEBO

EMPIRE

TOTAL INSTALLATIONS LISTED = 5

0- 4.9 =
5- 9.9 =
10-14.9 =
15-19.9 =
20-24.9 =
25-29.9 =
30-34.9 =
35-39.9 =
40-44.9 =

VANDENBERG

TOTAL INSTALLATIONS LISTED = 1

45-49.9 =
50-54.9 =
55-59.9 =
60-64.9 =
65-69.9 =
70-74.9 =
75-79.9 =
80-84.9 =
85-89.9 =
90-94.9 =
95-99.9 =
100-104.9 =

MISSILE OPERATIONS

AVG DAILY TONNAGE

INSTALLATIONS RESPONDING

0-4.9 =

5-9.9 =

F E WARREN

10-14.9 =

WALSTROM

WHITEMAN

15-19.9 =

ELLSWORTH

20-24.9 =

MINOT AFB

25-29.9 =

30-34.9 =

35-39.9 =

40-44.9 =

45-49.9 =

50-54.9 =

55-59.9 =

60-64.9 =

65-69.9 =

70-74.9 =

75-79.9 =

80-84.9 =

85-89.9 =

90-94.9 =

95-99.9 =

100-**** =

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 2

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

GROUND/BASIC TRAIN

AVG DAILY TONNAGE
INSTALLATIONS
RESPONDING

0- 4.9 =
5- 9.9 =
10-14.9 =
15-19.9 =
20-24.9 =
25-29.9 =

LACKLAND AFB

30-34.9 =
35-39.9 =
40-44.9 =
45-49.9 =
50-54.9 =
55-59.9 =
60-64.9 =
65-69.9 =
70-74.9 =
75-79.9 =
80-84.9 =
85-89.9 =
90-94.9 =
95-99.9 =
100-**** =

TOTAL INSTALLATIONS LISTED = 1

AVG DAILY TONNAGE	INSTALLATIONS RESPONDING
1000	100
2000	200
3000	300
4000	400
5000	500
6000	600
7000	700
8000	800
9000	900
10000	1000

0-4.9 =

AVG DAILY TONNAGE	INSTALLATIONS RESPONDING
1000	100
2000	200
3000	300
4000	400
5000	500
6000	600
7000	700
8000	800
9000	900
10000	1000

0-4.9 =

CLEAR
CASHMERE
FINLEY
FINNEY
POINT
NORTH
SPARRE
YUKON
AFSTON
CHARLEMAN
CAPE

KALISPELL
FORTUNA
ANTIGO
MPTUGUNA
PORINE AUSTIN
BLAINE
INDIAN MOUNTAIN
TATALINA
CHARLESTON AFS
CAPE ROMANZOF

HAVER
FT FISHER
BAUDETT
NORTH BEND
ST ALYON AFS
CAMPIEBUE AFS
KIN CITY
CALUMET

CAMBRIA
FINLAND
LOCKPORT
NORTH TRURO
WATER TOWN
COLD BAY AFS
MURPHY DOME
ROANOKE RAPIDS
CAPE LISBURN

TOTAL INSTALLATIONS LISTED = 38

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED - 1

TOTAL INSTALLATIONS LISTED - 1

MILL VALLEY

55-59,9 =

60-64.9

65-69.9

70-7A-9

75-70 9

00-000000

0
0
0
0
0

0000-0000

604-06

65-66-67

00-00

25

— 100 —

PRIMARY FUNCTION/TONNAGE CATEGORY UNIQUENESS

NOTE -- "0.00" INDICATES THAT THERE IS NO EVALUATION POSSIBLE.
 "0.00" INDICATES THAT NO EVALUATION WAS POSSIBLE.

	0.000	.986	.605	.273	.902	.106	0.000	.687	.584	.919
FLYING OPERATIONS 1.000	0.000	.986	.605	.273	.902	.106	0.000	.687	.584	.919
FLYING TRAINING .999	0.000	.958	.310	.157	.706	.020	0.000	.312	.222	
INDUS/LOGIS SUPPORT 1.000	0.000	.978	.538	.257	.844	.136	0.000	.588		
TECH/ACADM TRAINING .999	0.000	.970	.464	.224	.796	.097	0.000			
MEDICAL SERVICES 0.000	0.000	0.000	0.000	0.000	0.000	0.000				
ADMIN/HOT RS 1.000	0.000	.995	.839	.448	.968					
R & D LAB/CENTR .922	0.000	.901	.206	.113						
FLIGHT TEST CENTER .989	0.000	.980	.749							
TEST RANGE .996	0.000	.968								
MISSILE OPERATIONS .275	0.000									
GROUND/BASIC TRAIN 0.000										

PROBABILITY FUNCTION
PRIMARY/SECONDARY VS PRIMARY/SECONDARY FUNCTIONAL CATEGORY COMBINATIONS

PRIMARY CATEGORY SECONDARY CATEGORY "P" VALUE PRIMARY CATEGORY SECONDARY CATEGORY

FLYING OPERATIONS 0.0007 FLYING TRAINING ADMIN/HQ/RS
FLYING OPERATIONS 0.0060 FLYING TRAINING ADMIN/HQ/RS
FLYING OPERATIONS 0.0087 FLYING TRAINING ADMIN/HQ/RS
FLYING OPERATIONS 0.0093 FLYING TRAINING ADMIN/HQ/RS
FLYING OPERATIONS 0.0103 FLYING TRAINING ADMIN/HQ/RS
FLYING OPERATIONS 0.0123 FLYING TRAINING ADMIN/HQ/RS
FLYING OPERATIONS 0.0203 FLYING TRAINING ADMIN/HQ/RS

PATRICK
MCKAM
MOLLOHAN
AFA
CRAIG
MCGOUGH
LAUGHLIN
BRICKS
LARKINS
LOWRY
RICHARDS
LACK
KING
HOWARD
EDWARDS
NEELSON
MOUNTAIN
HOME

TOTAL INSTALLATIONS LISTED = 80

TOTAL SOLID WASTE COLLECTIONS: PER TONNAGE CATEGORY
 LISTED ARE INSTALLATIONS WITH 50 OR MORE TONS
 (TOTAL ANNUAL MINIMUM TONNAGE = 1020500. TONS.)

AVG DAILY INSTALLATIONS
 TONNAGE RESPONDING

0- 4.9 = 59 (36.9%)
 5- 9.9 = 15 (9.4%)
 10-14.9 = 18 (11.3%)
 15-19.9 = 16 (10.0%)
 20-24.9 = 12 (7.5%)
 25-29.9 = 9 (5.6%)
 30-34.9 = 8 (5.0%)
 35-39.9 = 5 (3.1%)
 40-44.9 = 4 (2.5%)
 45-49.9 = 3 (1.9%)
 50-54.9 = 6 (3.8%)

IN A SMSA-HILL VALLEY
 IN A SMSA-NELLS

IN A SMSA-BOLLING
 IN A SMSA-CHANUTE

IN A SMSA-BARKSDALE

HOWARD

55-59.9 = 1 (.6%)

KINCHELOE

60-64.9 = 0 (0.0%)

65-69.9 = 5 (3.1%)

IN A SMSA-PETERS

70-74.9 = 1 (.6%)

IN A SMSA-ELMENDORF

75-79.9 = 0 (0.0%)

80-84.9 = 1 (.6%)

IN A SMSA-ANDREWS

85-89.9 = 1 (.6%)

K I SAWYER

90-94.9 = 0 (0.0%)

95-99.9 = 0 (0.0%)

100-**** = 0 (0.0%)

TOTAL INSTALLATIONS LISTED = 6

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

DAILY TONNAGE OF
COLLECTED WASTEWATER, TREATMENT SLUDGES, STREET SWEEPINGS,
DEMOLITION WASTES AND GROUND MAINT. WASTES

AVG DAILY TONNAGE	INSTALLATIONS RESPONDING
0-4.9	= 96 (60.0%)
5-9.9	= 6 (3.8%)
10-14.9	= 2 (1.3%)
15-19.9	= 0 (0.0%)
20-24.9	= 1 (.6%)
25-***	= 5 (3.1%)
UNKNOWN	= 31.3*

INSTALLATIONS ARE LISTED IN ORDER OF INCREASING DAILY TONNAGE. FOR THE 1960-1961 PERIOD, THE TOTAL TONNAGE OF WASTEWATER, TREATMENT SLUDGES, STREET SWEEPINGS, DEMOLITION WASTES AND GROUND MAINT. WASTES WAS 1,000,000 TONS. THE AVERAGE DAILY TONNAGE WAS 2,740 TONS. THE TOTAL TONNAGE OF WASTEWATER, TREATMENT SLUDGES, STREET SWEEPINGS, DEMOLITION WASTES AND GROUND MAINT. WASTES WAS 1,000,000 TONS. THE AVERAGE DAILY TONNAGE WAS 2,740 TONS.

RESIDENTIAL COLLECTION AREA -- AVERAGE DAILY TONNAGES

INSTALLATIONS ARE LISTED WHICH HAVE TOTAL TONNAGES (RESIDENTIAL, COMMERCIAL, & INSTITUTIONAL) OF 50 TONS PER DAY (TPD).
 *INDICATES TOTAL TONNAGE OF 100 TPD AND OVER.

AVG DAILY TONNAGE	INSTALLATIONS RESPONDING			
0-4.9	= 91 (51.4%)			
	NELLIS			
5-9.9	= 38 (24.8%)			TOTAL INSTALLATIONS LISTED = 1
	MILL VALLEY			
10-14.9	= 16 (10.4%)		PETERSON FIELD	K I SAWYER
	ROLLING			KINCHELOE
				TOTAL INSTALLATIONS LISTED = 4
15-19.9	= 4 (2.6%)			
	ANDREWS		BARKSDALE	CHANUTE
				TOTAL INSTALLATIONS LISTED = 3
20-24.9	= 1 (.6%)			
25-29.9	= 0 (0.0%)			
30-34.9	= 2 (1.2%)			TOTAL INSTALLATIONS LISTED = 1
	HOWARD			
35-39.9	= 2 (1.2%)			
	ELMENDORF			
40-44.9	= 0 (0.0%)			
45-49.9	= 0 (0.0%)			
50-****	= 0 (0.0%)			TOTAL INSTALLATIONS LISTED = 1

----- COLLECTION C WASTES -----

BULKY "WHITE GOOD TYPE ITEMS SEPARATELY COLLECTED (OF INSTALLATIONS WHO HAVE A RESIDENTIAL AREA)

A: YES, ON A FIXED SCHEDULE = 14.5%
C: YES, ON AN ON-CALL BASIS = 34.2%
C: NO = 51.3%
TOTAL BASES = 152

METHOD OF COLLECTION IN RESIDENTIAL AREAS (OF THOSE WHO HAVE RESIDENTIAL AREAS)

INSTALLATIONS
CONTRACTOR CURBSIDE/BACK ALLEY SERVICE = 53.6%
CONTRACTOR NON-CURB/BACK DOOR SERVICE = 24.8%
IN-HOUSE CURBSIDE/BACK ALLEY SERVICE = 8.5%
IN-HOUSE NON-CURB/BACK DOOR SERVICE = 13.1%
TOTAL BASES = 153

ROUTINE RESIDENTIAL COLLECTION PICKUPS MADE PER WEEK

A: 1
A: 2
C: 3
C: 30RE
E: CUREMATHN
E: TOTAL INST. 153

METHOD OF COLLECTION / NUMBER OF PICKUPS--MATRIX
(OF THOSE INSTALLATIONS WHO HAVE RESIDENTIAL AREAS)

INSTALLATIONS WITH CONTRACTOR COLLECTION		INSTALLATIONS WITH IN-HOUSE COLLECTION	
CURBSIDE TYPE A	NON-CURB TYPE B	CURBSIDE TYPE C	NON-CURB TYPE D
1	21.1%	38.5%	10.0%
2	22.5%	30.8%	15.0%
3	67.3%	23.1%	65.0%
MORE	0.0%	7.7%	10.0%
METHOD TOT. = 41	38	13	20

METHOD OF COLLECTION / PLANS TO CHANGE METHOD--MATRIX
(OF THOSE INSTALLATIONS WHO HAVE RESIDENTIAL AREAS)

PRESENT METHOD		PRESENT METHOD	
CURBSIDE TYPE A	NON-CURB TYPE B	CURBSIDE TYPE C	NON-CURB TYPE D
95.1%	86.8%	46.2%	100.0%
0.0%	10.5%	23.1%	0.0%
2.0%	0.0%	0.0%	0.0%
0.0%	0.0%	0.0%	0.0%
2.0%	2.6%	30.8%	0.0%
UNDEC.	3.4	13	20
METHOD TOT. = 42	38	13	20

COMMERCIAL AND INSTITUTIONAL AREAS

METHOD OF COLLECTION		RESPONSES	
CONTRACTOR W/ON-CALL PICKUPS		0.0% OF INSTALLATIONS WITH CONTRACTOR COLLECTION:	
CONTRACTOR W/SCHEDULED PICKUPS		76.3% OF INSTALLATIONS WITH CONTRACTOR COLLECTION:	
CONTRACTOR W/COMBINATION		23.7% OF INSTALLATIONS WITH CONTRACTOR COLLECTION:	
TOTAL =		97 (60.8%) OF TOTAL INSTALLATIONS.	
IN-HOUSE W/ON-CALL PICKUPS		1.6% OF INSTALLATIONS WITH IN-HOUSE COLLECTION:	
IN-HOUSE W/SCHEDULED PICKUPS		21.0% OF INSTALLATIONS WITH IN-HOUSE COLLECTION:	
IN-HOUSE W/COMBINATION		77.4% OF INSTALLATIONS WITH IN-HOUSE COLLECTION:	
TOTAL =		63 (39.4%) OF TOTAL INSTALLATIONS.	

INSTALLATIONS W/CONTRACTOR COLLECTION IN BOTH RESIDENTIAL, AND COMMERCIAL AND INSTITUTIONAL AREAS = 90 (58.8%) OF INSTALLATIONS.
 INSTALLATIONS W/IN-HOUSE COLLECTION IN BOTH RESIDENTIAL, AND COMMERCIAL AND INSTITUTIONAL AREAS = 33 (21.2%) OF INSTALLATIONS.

METHOD OF COLLECTION / PLANS TO CHANGE METHOD--MATRIX

ALL BASES YES 12.5%
 UNDECIDED 5.6%
 NO 81.9%

PLANS TO CHANGE FROM THIS METHOD:

CONTRACTOR
 ONCALL 0.0%
 SCHED. 20.0%
 COMBO. 0.0%
 IN-HOUSE
 ONCALL 0.0%
 SCHED. 25.0%
 COMBO. 55.0%
 TOTAL = 20

PROCESSING OF WASTES

PROCESSING TYPE BY AREA -- MATRIX

PROCESSING TYPE	RESIDENTIAL	COMMISSARY	B.EXCHANGE (NOT INCLUDING COMMISSARY, BX)
COMPACTION	14.4%	16.3%	14.4%
BALING	0.0%	14.4%	14.4%
INCINERATION	11.1%	9.4%	10.0%
SPREADING	13.7%	0.0%	0.0%
OTHER	1.7%	11.3%	10.0%
2 OR MORE	59.6%	17.5%	19.6%
NONE	1.9%	28.1%	54.4%
TOTAL BASES	155	160	160

PLANS TO INCREASE SOLID WASTE PROCESS CAPABILITIES FOR FY77

A. YES -- RESIDENTIAL 0.0%
 B. YES -- COMM./INSTL. 1.9%
 C. YES -- BOTH A & B 1.9%
 D. UNDECIDED/CONSIDR G 90.8%
 E. NO 160
 TOTAL BASES

-----DISPOSAL OF WASTES-----

CONTRACTOR'S ON-BASE DISPOSAL

A.) RESIDENTIAL AREA CONTRACTOR ONLY	%S OF TOTAL INSTALLATIONS	%S OF RESID. CONTRACTOR	%S OF COMM/INSTI. CONTRACTOR
B.) COMM/INSTI. AREA CONTRACTOR ONLY	7.3%	10.0%	1.0%
C.) RESID. AND COMM/INSTI. AREA CONTRACTOR	10.0%	13.3%	16.5%
D.) NO CONTRACTORS DISPOSE ON BASE	65.0%	75.0%	81.4%
E.) BASE HAS NO CONTRACTORS	16.3%		
TOTAL	160	120	97

ON-BASE SANITARY LANDFILL DISPOSAL

A. BASES WITHOUT AN ON-BASE LANDFILL (5% OF INSTALLATIONS) ARE LISTED HERE: ("##" INDICATES THAT THE BASE GENERATES MORE THAN 50 TONS TOTAL PER DAY)

KALISPELL FORTUNA ANTIGO MINOT AFS POINT ARENA ROMA LK DOVER ANDREWS WHEELER HILL HILL MCQUIRE SHEPPARD CARSWELL LAKES GEORGETOWN AFB LUKE NIAGRA FALLS IAP ALBROOK KEESLER AFB	HAVRE FT FISHER BAUDETT MT LUGUNA PORT AUSTIN NORTH CARLETON STA COPPER CHARLES GILLING GEORGE MY HEBB CRAIG POPE NEWARK AFS VANANCE MARCH PATRICK SUNNYVALE AFS AVON PARK SARATOGA MCLELLAN CHANUTE	CAMBRIA FINLAND LOCKPORT NORTH BEND ST ALBANS CHARLESTON AFS TRISTON PETERSON FIELD IAP ALTUS MYRTLE BEACH KINGSLEY COLUMBUS ENGLAND RICHARDS-GEBAUR MC CONNELLY HOWARD CHARLESTON AFB RANDOLPH DULUTH IAP	CASWELL FINLEY HILL VALLEY NORTH VALLEY WATERTOWN KOTZBURG AFS CALUMET AFB GUYLER ALBUQUERQUE LITTLE ROCK LAUGHLIN EMPIRE WEBB HOMESTEAD KELLY LOS ANGELES AFS YOUNGSTOWN AFB GRIFFIN AFB SEELYE AFB REESE
--	--	--	---

TOTAL INSTALLATIONS LISTED = 91

B. FY76 AVERAGE DAILY TONNAGE-- (PERCENT OF THOSE WHO HAVE AN ON-BASE FILL)

(BASES THAT GENERATE MORE THAN 50 TONS TOTAL PER DAY ARE LISTED)

0- 4 = 29.0%
5- 9 = 7.2%
10- 14 = 14.5%
15- 19 = 13.0%
20- 24 = 7.2%
25- 29 = 11.6%
30- 34 = 2.9%
35- 39 = 1.4%
40- 44 = 4.3%
45- 49 = 1.4%
KINCHELOE

50- 54 = 2.9%
BARKSDALE
55- 59 = 0.0%
NELLIS

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 2

60- 64 = 0.0%

65- 69 = 0.0%

70- 74 = 2.9%

ELWENDORF

75- 79 = 0.0%

80- 84 = 0.0%

85- 89 = 1.4%

K I SAVER

90- 94 = 0.0%

95- 99 = 0.0%

100-9999 = 0.0%

10000 KNOW 15.0%

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

USE OF ON-BASE SANITARY LANDFILL BY OTHERS TOTAL BASES = 160

A. OTHER AIR INSTALLATIONS ONLY
 MAXWELL AFB LORING
 = 1.3% OF TOTAL INSTALLATIONS; 2.9% OF THOSE W/ON-BASE LANDFILLS.

B. OFF-BASE FEDERAL AGENCIES ONLY
 LANGLEY BEALE
 TOTAL INSTALLATIONS LISTED = 2
 = 1.9% OF TOTAL INSTALLATIONS; 4.3% OF THOSE W/ON-BASE LANDFILLS.

C. NON-FEDERAL ORGANIZATIONS ONLY
 ARNOLD EDC SEYMOUR-JOHNSON
 TOTAL INSTALLATIONS LISTED = 3
 = 1.3% OF TOTAL INSTALLATIONS; 2.9% OF THOSE W/ON-BASE LANDFILLS.

D. OTHER AF INSTALLATIONS AND OFF-BASE FEDERAL AGENCIES
 TINKER
 TOTAL INSTALLATIONS LISTED = 2
 = .6% OF TOTAL INSTALLATIONS; 1.4% OF THOSE W/ON-BASE LANDFILLS.

E. OTHER AF INSTALLATIONS AND NON-FEDERAL ORGANIZATIONS
 TOTAL INSTALLATIONS LISTED = 1
 = .0% OF TOTAL INSTALLATIONS; 0.0% OF THOSE W/ON-BASE LANDFILLS.

F. FEDERAL AGENCIES AND NON-FEDERAL ORGANIZATIONS
 KIRTLAND
 TOTAL INSTALLATIONS LISTED = 0
 = .6% OF TOTAL INSTALLATIONS; 1.4% OF THOSE W/ON-BASE LANDFILLS.

G. AF INSTALL., FED. AGEN., AND NON-FED. ORGS.
 PATRICK EDWARDS
 TOTAL INSTALLATIONS LISTED = 1
 = 1.3% OF TOTAL INSTALLATIONS; 2.9% OF THOSE W/ON-BASE LANDFILLS.

H. NO OTHERS USE ON-BASE LANDFILL
 I. THERE IS NO ON-BASE LANDFILL
 TOTAL INSTALLATIONS LISTED = 2
 = 36.3% OF TOTAL INSTALLATIONS; 84.8% OF THOSE W/ON-BASE LANDFILLS.
 = 56.9% OF TOTAL INSTALLATIONS

PAYMENT FOR USE OF ON-BASE LANDFILL
 A: YES = 8.3%
 B: NO = 8.3%
 C: SOME = 8.3%
 D: NO OUTSIDE USERS = 36.3%
 E: NO ON-BASE FILLS = 56.3%

THOSE WHO HAVE OUTSIDE USERS
 OF THOSE WHO HAVE OUTSIDE USERS
 OF THOSE WHO HAVE OUTSIDE USERS
 OF TOTAL INSTALLATIONS

FOR THOSE INSTALLATIONS RECEIVING A "TIPPING/DUMPING" FEE, THE FOLLOWING PERCENTAGES REFLECT THE FEES (\$/TON):

0.00- .99 = 0.0%	1.00- 1.99 = 0.0%	2.00- 2.99 = 0.0%	3.00- 3.99 = 0.0%
4.00- 4.99 = 0.0%	5.00- 5.99 = 0.0%	6.00- 6.99 = 0.0%	7.00- 7.99 = 50.0%
8.00- 8.99 = 0.0%	9.00- 9.99 = 0.0%	10.00- 10.99 = 0.0%	11.00- 11.99 = 0.0%
12.00- 12.99 = 0.0%	13.00- 13.99 = 0.0%	14.00- 14.99 = 0.0%	15.00- 15.99 = 0.0%
16.00- 16.99 = 0.0%	17.00- 17.99 = 0.0%	18.00- 18.99 = 0.0%	19.00- 19.99 = 0.0%
20.00- 21.99 = 0.0%	22.00- 23.99 = 0.0%	24.00- 25.99 = 0.0%	26.00- 27.99 = 0.0%
28.00- 29.99 = 0.0%	30.00- ***** = 0.0%		

LIFE EXPECTANCY -- ON-BASE SANITARY LANDFILL

(%S OF TOTAL BASES WITH ON-BASE FILL)

6 MO.	1 YR.	2 YR.	3 YR.	4 YR.	5 YR.	6 - 10	OVER 10
5.8%	7.2%	4.3%	4.3%	5.8%	8.7%	1.4%	10.1%
							52.2%

LISTED BASES FOR SHORT TERM LIFE EXPECTANCY (4 YEARS OF LESS) FOR ON-BASE SANITARY LANDFILL:
(***) INDICATES ANOTHER LANDFILL SITE OR ALTERNATE MEANS OF DISPOSAL HAS BEEN SELECTED.)

6 MONTHS (***) 21.1% OF INSTALLATIONS WITH SHORT TERM LANDFILLS)

* TYNDALL AFB

* NORTON

1 YEAR(S) (***) 21.1% OF INSTALLATIONS WITH SHORT TERM LANDFILLS)

* WRIGHT-PATTERSON

* ROBINS

2 YEAR(S) (***) 15.8% OF INSTALLATIONS WITH SHORT TERM LANDFILLS)

* LANGLEY

* ELMENDORF

3 YEAR(S) (***) 10.5% OF INSTALLATIONS WITH SHORT TERM LANDFILLS)

* MOODY

* SCOTT

4 YEAR(S) (***) 21.1% OF INSTALLATIONS WITH SHORT TERM LANDFILLS)

* ARNOLD EDC

* HURLBURT FIELD

(IN SUMMARY: 89.5% OF THE INSTALLATIONS WITH SHORT TERM LANDFILLS HAVE SELECTED ANOTHER SITE OR ALTERNATE MEANS OF DISPOSAL)

EXCLUSIONS FROM ON-BASE LANDFILL USE:

(THE FOLLOWING PERCENTAGES REFLECT WASTE EXCLUSIONS BY INSTALLATIONS WITH ON-BASE SANITARY LANDFILLS)

A) CONSTRUCTION, DEMOLITION, INDUSTRIAL WASTES

22.9%

B) CONSTRUCTION, DEMOLITION ONLY

8.6%

C) INDUSTRIAL WASTES ONLY

17.1%

D) NO EXCLUSIONS FOR CONSTRUCTION, DEMOLITION, INDUSTRIAL WASTES

51.4%

INSTALLATIONS ARE LISTED FOR THE FOLLOWING: (IF ANY)

HOLLOMAN PLATTSBURGH

ARNOLD EDC BLYTHEVILLE

D) NO EXCLUSIONS (CONSTR+DEMO, INDUS WASTES):

CLEAR YUKON

INDIAN MOUNTAIN

CAPE ROMANZOF

ANDERSON

LOWRY AFB

SHAW

WHITEMAN

E) INFECTIOUS WASTES = 90.0% EXCLUSION

F) SLUDGES, LIQUID WASTES

52.9%

G) SLUDGES ONLY

1.4%

H) LIQUID WASTES ONLY

12.9%

I) NO EXCLUSIONS SLUDGES & LIQ. WASTES

31.4%

J) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

K) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

L) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

M) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

N) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

O) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

P) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

Q) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

R) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

S) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

T) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

U) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

V) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

W) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

X) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

Y) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

Z) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AA) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AB) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AC) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AD) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AE) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AF) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AG) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AH) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AI) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AJ) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AK) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AL) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AM) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

AN) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AO) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AP) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AQ) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AR) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AS) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AT) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AU) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AV) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AW) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AX) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AY) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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AZ) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BA) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BB) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BC) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BD) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BE) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BF) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BG) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BH) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BI) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BJ) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BK) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BL) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BM) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BN) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BO) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BP) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BQ) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BR) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BS) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BT) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BU) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BV) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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BW) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

BX) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

BY) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

BZ) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

CA) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

CB) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CC) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CD) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CE) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CF) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CG) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CH) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CI) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CJ) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CK) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CL) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CM) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CN) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CO) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CP) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CQ) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CR) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CS) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CT) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CU) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CV) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CW) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CX) NO EXCLUSIONS SLUDGES & LIQ. WASTES

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CY) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

CZ) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

DA) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

DB) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

DC) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

DD) NO EXCLUSIONS SLUDGES & LIQ. WASTES

100%

DE) NO EXCLUSIONS SLUDGES & LIQ

INSTALLATIONS ARE LISTED FOR THE FOLLOWING: (IF ANY)

G) SLUDGES ONLY:

FGLIN

H) LIQUID WASTES ONLY:

BORTNE
K. T. SAUER
EDWARDS

ARNOLD EDC
RICKENBACKER

I) NO EXCLUSIONS (SLUDGES, LIQUID WASTES):

SHEVYA
INDIAN MOUNTAIN
IN CITY
CIN CITY
KING SALMON APT
WINDOT AFB

CAMPION AFS
MURPHY DOOME
CAPE LISBURNE
E. A. SHORTH
WHITEMAN

TOTAL INSTALLATIONS LISTED = 1

MURKURT FIELD
SCOTT

TOTAL INSTALLATIONS LISTED = 9

FORT YUKON
TATIANA
CAPE ROMANZOF
BARKSDALE
SHAW

TOTAL INSTALLATIONS LISTED = 22

MACDILL
NORTON

COLD BAY AFS
SPARREVOORN AFS
CAPE NEMENHAM
F. E. WARREN
LORING

OFF-BASE LANDFILLS

1. FOR INSTAL. THAT HAVE OFF-BASE LANDFILLS, THE FOLLOWING %'S REFLECT DAILY TONNAGES DISPOSED
2. LISTED ARE INSTALLATIONS DISPOSING 50 TONS OR MORE PER DAY IN OFF-BASE LANDFILLS

AVG DAILY TONNAGE	INSTALLATIONS RESPONDING
0-4.9	= 51 (45.9%)
5-9.9	= 16 (14.4%)
10-14.9	= 9 (8.1%)
15-19.9	= 8 (7.2%)
20-24.9	= 3 (2.7%)
25-29.9	= 5 (4.5%)
30-34.9	= 5 (4.5%)
35-39.9	= 4 (3.6%)
40-44.9	= 1 (.9%)
45-49.9	= 0 (0.0%)
50-54.9	= 0 (0.0%)
55-59.9	= 1 (.9%)

ALBROOK

60-64.9 = 1 (.9%)

PETERSON FIELD

65-69.9 = 1 (.9%)

MILL VALLEY

70-74.9 = 1 (.9%)

HICKAM

75-79.9 = 0 (0.0%)

80-84.9 = 1 (.9%)

ANDREWS

85-89.9 = 0 (0.0%)

90-94.9 = 1 (.9%)

CHANUTE

95-99.9 = 0 (0.0%)

GREATER THAN 100 (.9%)

HOWARD

DON'T KNOW (1.8%)

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 1

LIFE EXPECTANCY -- OFF-BASE SANITARY LANDFILL

6 MO. 1 YR. 2 YR. 3 YR. 4 YR. 5 YR. 6 - 10 OVER 10 NO OFF-BASE
FILL USED

.6% 2.5% 2.5% 1.3% 1.9% 8.1% 3.8% 14.4% 35.0% 30.0% = 100% OF ALL INSTALLATIONS.

(%S OF INSTALLATIONS USING OFF-BASE SANITARY LANDFILL)

.9% 3.6% 3.6% 1.8% 2.7% 11.6% 5.4% 20.5% 50.0%

LISTED BASES FOR SHORT TERM LIFE EXPECTANCY (4 YEARS OF LESS) FOR OFF-BASE SANITARY LANDFILL:
("M" INDICATES ANOTHER LANDFILL SITE OR ALTERNATE MEANS OF DISPOSAL HAS BEEN SELECTED.)

6 MONTHS ("M") 7.1% OF INSTALLATIONS WITH SHORT TERM LANDFILLS)

* CANNON

TOTAL INSTALLATIONS LISTED = 1

1 YEAR(S) ("M") 21.4% OF INSTALLATIONS WITH SHORT TERM LANDFILLS)

* ANTIGO

GRISSON

* HOMESTEAD

TOTAL INSTALLATIONS LISTED = 4

2 YEAR(S) ("M") 21.4% OF INSTALLATIONS WITH SHORT TERM LANDFILLS)

* MCGUIRE

* GRAND FORKS

PEASE

* LOS ANGELES AFS

TOTAL INSTALLATIONS LISTED = 4

3 YEAR(S) ("M") 7.1% OF INSTALLATIONS WITH SHORT TERM LANDFILLS)

COLUMBUS

* OFFUTT

TOTAL INSTALLATIONS LISTED = 2

4 YEAR(S) ("M") 14.3% OF INSTALLATIONS WITH SHORT TERM LANDFILLS)

* PORT AUSTIN

* MT HEBD

EGLIN

TOTAL INSTALLATIONS LISTED = 3

(IN SUMMARY: 71.4% OF THE INSTALLATIONS WITH SHORT TERM LANDFILLS HAVE SELECTED ANOTHER SITE OR ALTERNATE MEANS OF DISPOSAL)

OFF-BASE INCINERATORS

1. INSTALLATIONS WITHOUT OFF-BASE INCINERATOR SITE = 96.9% OF TOTAL INSTALLATIONS
2. THE FOLLOWING PERCENTAGES REFLECT AVERAGE DAILY TONNAGES DISPOSED IN OFF-BASE INCINERATOR SITES
3. LISTED ARE INSTALLATIONS DISPOSING 50 TONS OR MORE PER DAY IN OFF-BASE INCINERATORS

PERCENT OF INSTALLATIONS PER TONNAGE CATEGORY -- FOR THOSE WITH OFF-BASE INCINERATOR SITE

AVG DAILY TONNAGE	INSTALLATIONS RESPONDING
0-4.9	2 (40.0%)
5-9.9	1 (20.0%)
10-14.9	0 (0.0%)
15-19.9	0 (0.0%)
20-24.9	0 (0.0%)
25-29.9	1 (20.0%)
30-34.9	0 (0.0%)
35-39.9	0 (0.0%)
40-44.9	0 (0.0%)
45-49.9	0 (0.0%)
50-54.9	0 (0.0%)
55-59.9	0 (0.0%)
60-64.9	0 (0.0%)
65-69.9	0 (0.0%)
70-74.9	0 (0.0%)
75-79.9	0 (0.0%)
80-84.9	0 (0.0%)
85-89.9	0 (0.0%)
90-94.9	0 (0.0%)
95-99.9	0 (0.0%)
GREATER THAN 100	0 (0.0%)
DON'T KNOW	20.0%

SOLID WASTE TRANSFER STATIONS

-- %'S OF TOTAL INSTALLATIONS

USE OF SOLID WASTE TRANSFER STATIONS

A) DO NOT USE

B) DO NOT USE -- BUT HAVE PLANS FOR USE OF ON-BASE FACILITY DURING FY77

C) DO NOT USE -- BUT HAVE PLANS FOR USE OF OFF-BASE FACILITY DURING FY77

D) ONE OR MORE ON-BASE FACILITIES

PATRICK

HILL

MCCLELLAN

CHANUTE

TOTAL INSTALLATIONS LISTED = 4

E) ONE OR MORE OFF-BASE FACILITIES

BOLLING

HICKAM

LOS ANGELES AFS

1.9% (INSTALLATIONS ARE LISTED BELOW)

TOTAL INSTALLATIONS LISTED = 3

SOLID WASTE TRANSFER STATION TONNAGES

1. INSTALLATIONS WITHOUT TRANSFER STATIONS = 93.1% OF TOTAL INSTALLATIONS
2. THE FOLLOWING PERCENTAGES REFLECT AVERAGE DAILY TONNAGES HANDLED THROUGH TRANSFER STATIONS
3. LISTED ARE INSTALLATIONS HANDLING 50 TONS OR MORE PER DAY THROUGH TRANSFER STATIONS

AVG DAILY TONNAGE	INSTALLATIONS RESPONDING
0- 4.9	= 4 (36.4%)
5- 9.9	= 1 (9.1%)
10-14.9	= 0 (0.0%)
15-19.9	= 1 (9.1%)
20-24.9	= 1 (9.1%)
25-29.9	= 2 (18.2%)
30-34.9	= 0 (0.0%)
35-39.9	= 1 (9.1%)
40-44.9	= 1 (9.1%)
45-49.9	= 0 (0.0%)
50-54.9	= 0 (0.0%)
55-59.9	= 0 (0.0%)
60-64.9	= 0 (0.0%)
65-69.9	= 0 (0.0%)
70-74.9	= 0 (0.0%)
75-79.9	= 0 (0.0%)
80-84.9	= 0 (0.0%)
85-89.9	= 0 (0.0%)
90-94.9	= 0 (0.0%)
95-99.9	= 0 (0.0%)
GREATER THAN 100	(0.0%)

DISPOSAL FACILITY USE (OTHER THAN OR IN ADDITION TO LANDFILLS AND OFF-BASE INCINERATORS/TRANSFER STATIONS)

INSTALLATIONS ANSWERING A, B, OR C ARE LISTED RESPECTIVELY.

A) MATERIAL RECOVERY ORIENTED	HILL WURTSMITH	ROBINS EDWARDS	5.0% OF TOTAL INSTALLATIONS	BARKSDALE REESE	NORTON CHANUTE	TOTAL INSTALLATIONS LISTED = 8
H) ENERGY RECOVERY ORIENTED			0.0%			
C) MATERIAL AND ENERGY RECOVERY ORIENTED			0.0%			
D) OTHER THAN MATERIAL AND/OR ENERGY ORIENTED			13.8%			
E) DO NOT USE OTHER DISPOSAL FACILITIES			81.3%			

DISPOSAL METHOD OF SOLID WASTE

RESIDENTIAL AREA COMMERCIAL/INSTITUTIONAL

CONTRACTOR
ON-BASE
OFF-BASE
IN-HOUSE
ON-BASE
OFF-BASE
COMBINATION
TOTAL

15.6%
58.1%
13.8%
2.5%
5.6%
100.0%

11.3%
50.6%
26.9%
6.3%
5.0%
100.0%

OF TOTAL INSTALLATIONS

TOTAL FY76 COLLECTION AND DISPOSAL COST
(FOR RESID./COMMER./INSTI. SOLID WASTE)

MINIMUM TOTAL COST = \$ 16960000.

PERCENTAGE RESPONSES PER COST CATEGORY
(COST IS IN THOUSANDS OF DOLLARS)

0.0%
20.0%
40.0%
60.0%
80.0%
100.0%
120.0%
140.0%
160.0%
180.0%

6.3%
1.3%
1.3%
1.3%
1.3%
1.3%
1.3%
1.3%
1.3%
1.3%

11.3%
1.3%
1.3%
1.3%
1.3%
1.3%
1.3%
1.3%
1.3%
1.3%

15.0%
10.0%
10.0%
10.0%
10.0%
10.0%
10.0%
10.0%
10.0%
10.0%

TOTAL FY76 COLLECTION COST (FOR RESID./COMMER./INSTI. SOLID WASTE)

MINIMUM TOTAL COST = \$ 12460000.

PERCENTAGE RESPONSES PER COST CATEGORY
(COST IS IN THOUSANDS OF DOLLARS)

0.0%
20.0%
40.0%
60.0%
80.0%
100.0%
120.0%
140.0%
160.0%
180.0%

9.1%
1.3%
1.3%
1.3%
1.3%
1.3%
1.3%
1.3%
1.3%
1.3%

23.1%
0.0%
0.0%
0.0%
0.0%
0.0%
0.0%
0.0%
0.0%
0.0%

15.0%
10.0%
10.0%
10.0%
10.0%
10.0%
10.0%
10.0%
10.0%
10.0%

\$ / TON FY76 COLLECTION COST

A.) CONTRACTOR

[illegible]

A.) IN-HOUSE

[illegible]

----- TOTAL FY76 DISPOSAL COST (FOR RESID./COMMER./INSTI. SOLID WASTE) -----

MINIMUM TOTAL COST = \$ 3760000.

PERCENTAGE RESPONSE FOR COST CATEGORY
(COST IS IN THOUSANDS OF DOLLARS)

0.0-4.0 =	31.3%	5.0-9.9 =	7.5%	10.0-14.9 =	12.5%	15.0-19.9 =	8.9%
20.0-24.9 =	5.0%	25.0-29.9 =	6.9%	30.0-34.9 =	4.4%	35.0-39.9 =	2.5%
40.0-44.9 =	6.1%	45.0-49.9 =	3.1%	50.0-54.9 =	3.8%	55.0-59.9 =	4.4%
60.0-64.9 =	3.1%	65.0-69.9 =	1.6%	70.0-74.9 =	1.6%	75.0-79.9 =	1.6%
80.0-84.9 =	1.3%	85.0-89.9 =	1.3%	90.0-94.9 =	1.3%	95.0-99.9 =	1.6%
100.0-104.9 =	1.3%	105.0-109.9 =	1.3%	110.0-114.9 =	1.6%	115.0-119.9 =	1.6%
120.0-124.9 =	1.3%	125.0-129.9 =	1.3%	130.0-134.9 =	1.6%	135.0-139.9 =	1.6%
140.0-144.9 =	1.3%	145.0-149.9 =	1.3%	150.0-154.9 =	1.6%	155.0-159.9 =	1.6%
160.0-164.9 =	1.3%	165.0-169.9 =	1.3%	170.0-174.9 =	1.6%	175.0-179.9 =	1.6%
180.0-184.9 =	1.3%	185.0-189.9 =	1.3%	190.0-194.9 =	1.6%	195.0-199.9 =	1.6%
200.0-204.9 =	1.3%	205.0-209.9 =	1.3%	210.0-214.9 =	1.6%	215.0-219.9 =	1.6%
220.0-224.9 =	1.3%	225.0-229.9 =	1.3%	230.0-234.9 =	1.6%	235.0-239.9 =	1.6%
240.0-244.9 =	1.3%	245.0-249.9 =	1.3%	250.0-254.9 =	1.6%	255.0-259.9 =	1.6%
260.0-264.9 =	1.3%	265.0-269.9 =	1.3%	270.0-274.9 =	1.6%	275.0-279.9 =	1.6%
280.0-284.9 =	1.3%	285.0-289.9 =	1.3%	290.0-294.9 =	1.6%	295.0-299.9 =	1.6%
300.0-304.9 =	1.3%	305.0-309.9 =	1.3%	310.0-314.9 =	1.6%	315.0-319.9 =	1.6%
320.0-324.9 =	1.3%	325.0-329.9 =	1.3%	330.0-334.9 =	1.6%	335.0-339.9 =	1.6%
340.0-344.9 =	1.3%	345.0-349.9 =	1.3%	350.0-354.9 =	1.6%	355.0-359.9 =	1.6%
360.0-364.9 =	1.3%	365.0-369.9 =	1.3%	370.0-374.9 =	1.6%	375.0-379.9 =	1.6%
380.0-384.9 =	1.3%	385.0-389.9 =	1.3%	390.0-394.9 =	1.6%	395.0-399.9 =	1.6%
400.0-404.9 =	1.3%	405.0-409.9 =	1.3%	410.0-414.9 =	1.6%	415.0-419.9 =	1.6%
420.0-424.9 =	1.3%	425.0-429.9 =	1.3%	430.0-434.9 =	1.6%	435.0-439.9 =	1.6%
440.0-444.9 =	1.3%	445.0-449.9 =	1.3%	450.0-454.9 =	1.6%	455.0-459.9 =	1.6%
460.0-464.9 =	1.3%	465.0-469.9 =	1.3%	470.0-474.9 =	1.6%	475.0-479.9 =	1.6%
480.0-484.9 =	1.3%	485.0-489.9 =	1.3%	490.0-494.9 =	1.6%	495.0-499.9 =	1.6%
500.0-504.9 =	1.3%	505.0-509.9 =	1.3%	510.0-514.9 =	1.6%	515.0-519.9 =	1.6%
520.0-524.9 =	1.3%	525.0-529.9 =	1.3%	530.0-534.9 =	1.6%	535.0-539.9 =	1.6%
540.0-544.9 =	1.3%	545.0-549.9 =	1.3%	550.0-554.9 =	1.6%	555.0-559.9 =	1.6%
560.0-564.9 =	1.3%	565.0-569.9 =	1.3%	570.0-574.9 =	1.6%	575.0-579.9 =	1.6%
580.0-584.9 =	1.3%	585.0-589.9 =	1.3%	590.0-594.9 =	1.6%	595.0-599.9 =	1.6%
600.0-604.9 =	1.3%	605.0-609.9 =	1.3%	610.0-614.9 =	1.6%	615.0-619.9 =	1.6%
620.0-624.9 =	1.3%	625.0-629.9 =	1.3%	630.0-634.9 =	1.6%	635.0-639.9 =	1.6%
640.0-644.9 =	1.3%	645.0-649.9 =	1.3%	650.0-654.9 =	1.6%	655.0-659.9 =	1.6%
660.0-664.9 =	1.3%	665.0-669.9 =	1.3%	670.0-674.9 =	1.6%	675.0-679.9 =	1.6%
680.0-684.9 =	1.3%	685.0-689.9 =	1.3%	690.0-694.9 =	1.6%	695.0-699.9 =	1.6%
700.0-704.9 =	1.3%	705.0-709.9 =	1.3%	710.0-714.9 =	1.6%	715.0-719.9 =	1.6%
720.0-724.9 =	1.3%	725.0-729.9 =	1.3%	730.0-734.9 =	1.6%	735.0-739.9 =	1.6%
740.0-744.9 =	1.3%	745.0-749.9 =	1.3%	750.0-754.9 =	1.6%	755.0-759.9 =	1.6%
760.0-764.9 =	1.3%	765.0-769.9 =	1.3%	770.0-774.9 =	1.6%	775.0-779.9 =	1.6%
780.0-784.9 =	1.3%	785.0-789.9 =	1.3%	790.0-794.9 =	1.6%	795.0-799.9 =	1.6%
800.0-804.9 =	1.3%	805.0-809.9 =	1.3%	810.0-814.9 =	1.6%	815.0-819.9 =	1.6%
820.0-824.9 =	1.3%	825.0-829.9 =	1.3%	830.0-834.9 =	1.6%	835.0-839.9 =	1.6%
840.0-844.9 =	1.3%	845.0-849.9 =	1.3%	850.0-854.9 =	1.6%	855.0-859.9 =	1.6%
860.0-864.9 =	1.3%	865.0-869.9 =	1.3%	870.0-874.9 =	1.6%	875.0-879.9 =	1.6%
880.0-884.9 =	1.3%	885.0-889.9 =	1.3%	890.0-894.9 =	1.6%	895.0-899.9 =	1.6%
900.0-904.9 =	1.3%	905.0-909.9 =	1.3%	910.0-914.9 =	1.6%	915.0-919.9 =	1.6%
920.0-924.9 =	1.3%	925.0-929.9 =	1.3%	930.0-934.9 =	1.6%	935.0-939.9 =	1.6%
940.0-944.9 =	1.3%	945.0-949.9 =	1.3%	950.0-954.9 =	1.6%	955.0-959.9 =	1.6%
960.0-964.9 =	1.3%	965.0-969.9 =	1.3%	970.0-974.9 =	1.6%	975.0-979.9 =	1.6%
980.0-984.9 =	1.3%	985.0-989.9 =	1.3%	990.0-994.9 =	1.6%	995.0-999.9 =	1.6%
1000.0-1004.9 =	1.3%	1005.0-1009.9 =	1.3%	1010.0-1014.9 =	1.6%	1015.0-1019.9 =	1.6%
1020.0-1024.9 =	1.3%	1025.0-1029.9 =	1.3%	1030.0-1034.9 =	1.6%	1035.0-1039.9 =	1.6%
1040.0-1044.9 =	1.3%	1045.0-1049.9 =	1.3%	1050.0-1054.9 =	1.6%	1055.0-1059.9 =	1.6%
1060.0-1064.9 =	1.3%	1065.0-1069.9 =	1.3%	1070.0-1074.9 =	1.6%	1075.0-1079.9 =	1.6%
1080.0-1084.9 =	1.3%	1085.0-1089.9 =	1.3%	1090.0-1094.9 =	1.6%	1095.0-1099.9 =	1.6%
1100.0-1104.9 =	1.3%	1105.0-1109.9 =	1.3%	1110.0-1114.9 =	1.6%	1115.0-1119.9 =	1.6%
1120.0-1124.9 =	1.3%	1125.0-1129.9 =	1.3%	1130.0-1134.9 =	1.6%	1135.0-1139.9 =	1.6%
1140.0-1144.9 =	1.3%	1145.0-1149.9 =	1.3%	1150.0-1154.9 =	1.6%	1155.0-1159.9 =	1.6%
1160.0-1164.9 =	1.3%	1165.0-1169.9 =	1.3%	1170.0-1174.9 =	1.6%	1175.0-1179.9 =	1.6%
1180.0-1184.9 =	1.3%	1185.0-1189.9 =	1.3%	1190.0-1194.9 =	1.6%	1195.0-1199.9 =	1.6%
1200.0-1204.9 =	1.3%	1205.0-1209.9 =	1.3%	1210.0-1214.9 =	1.6%	1215.0-1219.9 =	1.6%
1220.0-1224.9 =	1.3%	1225.0-1229.9 =	1.3%	1230.0-1234.9 =	1.6%	1235.0-1239.9 =	1.6%
1240.0-1244.9 =	1.3%	1245.0-1249.9 =	1.3%	1250.0-1254.9 =	1.6%	1255.0-1259.9 =	1.6%
1260.0-1264.9 =	1.3%	1265.0-1269.9 =	1.3%	1270.0-1274.9 =	1.6%	1275.0-1279.9 =	1.6%
1280.0-1284.9 =	1.3%	1285.0-1289.9 =	1.3%	1290.0-1294.9 =	1.6%	1295.0-1299.9 =	1.6%
1300.0-1304.9 =	1.3%	1305.0-1309.9 =	1.3%	1310.0-1314.9 =	1.6%	1315.0-1319.9 =	1.6%
1320.0-1324.9 =	1.3%	1325.0-1329.9 =	1.3%	1330.0-1334.9 =	1.6%	1335.0-1339.9 =	1.6%
1340.0-1344.9 =	1.3%	1345.0-1349.9 =	1.3%	1350.0-1354.9 =	1.6%	1355.0-1359.9 =	1.6%
1360.0-1364.9 =	1.3%	1365.0-1369.9 =	1.3%	1370.0-1374.9 =	1.6%	1375.0-1379.9 =	1.6%
1380.0-1384.9 =	1.3%	1385.0-1389.9 =	1.3%	1390.0-1394.9 =	1.6%	1395.0-1399.9 =	1.6%
1400.0-1404.9 =	1.3%	1405.0-1409.9 =	1.3%	1410.0-1414.9 =	1.6%	1415.0-1419.9 =	1.6%
1420.0-1424.9 =	1.3%	1425.0-1429.9 =	1.3%	1430.0-1434.9 =	1.6%	1435.0-1439.9 =	1.6%
1440.0-1444.9 =	1.3%	1445.0-1449.9 =	1.3%	1450.0-1454.9 =	1.6%	1455.0-1459.9 =	1.6%
1460.0-1464.9 =	1.3%	1465.0-1469.9 =	1.3%	1470.0-1474.9 =	1.6%	1475.0-1479.9 =	1.6%
1480.0-1484.9 =	1.3%	1485.0-1489.9 =	1.3%	1490.0-1494.9 =	1.6%	1495.0-1499.9 =	1.6%
1500.0-1504.9 =	1.3%	1505.0-1509.9 =	1.3%	1510.0-1514.9 =	1.6%	1515.0-1519.9 =	1.6%
1520.0-1524.9 =	1.3%	1525.0-1529.9 =	1.3%	1530.0-1534.9 =	1.6%	1535.0-1539.9 =	1.6%
1540.0-1544.9 =	1.3%	1545.0-1549.9 =	1.3%	1550.0-1554.9 =	1.6%	1555.0-1559.9 =	1.6%
1560.0-1564.9 =	1.3%	1565.0-1569.9 =	1.3%	1570.0-1574.9 =	1.6%	1575.0-1579.9 =	1.6%
1580.0-1584.9 =	1.3%	1585.0-1589.9 =	1.3%	1590.0-1594.9 =	1.6%	1595.0-1599.9 =	1.6%
1600.0-1604.9 =	1.3%	1605.0-1609.9 =	1.3%	1610.0-1614.9 =	1.6%	1615.0-1619.9 =	1.6%
1620.0-1624.9 =	1.3%	1625.0-1629.9 =	1.3%	1630.0-1634.9 =	1.6%	1635.0-1639.9 =	1.6%
1640.0-1644.9 =	1.3%	1645.0-1649.9 =	1.3%	1650.0-1654.9 =	1.6%	1655.0-1659.9 =	1.6%
1660.0-1664.9 =	1.3%	1665.0-1669.9 =	1.3%	1670.0-1674.9 =	1.6%	1675.0-1679.9 =	1.6%
1680.0-1684.9 =	1.3%	1685.0-1689.9 =	1.3%	1690.0-1694.9 =	1.6%	1695.0-1699.9 =	1.6%
1700.0-1704.9 =	1.3%	1705.0-1709.9 =	1.3%	1710.0-1714.9 =	1.6%	1715.0-1719.9 =	1.6%
1720.0-1724.9 =	1.3%	1725.0-1729.9 =	1.3%	1730.0-1734.9 =	1.6%	1735.0-1739.9 =	1.6%
1740.0-1744.9 =	1.3%	1745.0-1749.9 =	1.3%	1750.0-1754.9 =	1.6%	1755.0-1759.9 =	1.6%
1760.0-1764.9 =	1.3%	1765.0-1769.9 =	1.3%	1770.0-1774.9 =	1.6%	1775.0-1779.9 =	1.6%
1780.0-1784.9 =	1.3%	1785.0-1789.9 =	1.3%	1790.0-1794.9 =	1.6%	1795.0-1799.9 =	1.6%
1800.0-1804.9 =	1.3%	1805.0-1809.9 =	1.3%	1810.0-1814.9 =	1.6%	1815.0-1819.9 =	1.6%
1820.0-1824.9 =	1.3%	1825.0-1829.9 =	1.3%	1830.0-1834.9 =	1.6%	1835.0-1839.9 =	1.6%
1840.0-1844.9 =	1.3%	1845.0-1849.9 =	1.3%	1850.0-1854.9 =	1.6%	1855.0-1859.9 =	1.6%
1860.0-1864.9 =	1.3%	1865.0-1869.9 =	1.3%	1870.0-1874.9 =	1.6%	1875.0-1879.9 =	1.6%
1880.0-1884.9 =	1.3%	1885.0-1889.9 =	1.3%	1890.0-1894.9 =	1.6%	1895.0-1899.9 =	1.6%
1900.0-1904.9 =	1.3%	1905.0-1909.9 =	1.3%	1910.0-1914.9 =	1.6%	1915.0-1919.9 =	1.6%
1920.0-1924.9 =	1.3%	1925.0-1929.9 =	1.3%	1930.0-1934.9 =	1.6%	1935.0-1939.9 =	1.6%
1940.0-1944.9 =	1.3%	1945.0-1949.9 =	1.3%	1950.0-1954.9 =	1.6%	1955.0-1959.9 =	1.6%
1960.0-1964.9 =	1.3%	1965.0-1969.9 =	1.3%	1970.0-1974.9 =	1.6%	1975.0-1979.9 =	1.6%
1980.0-1984.9 =	1.3%	1985.0-1989.9 =	1.3%	1990.0-1994.9 =	1.6%	1995.0-1999.9 =	1.6%
2000.0-2004.9 =	1.3%	2005.0-2009.9 =	1.3%	2010.0-2014.9 =	1.6%	2015.0-2019.9 =	1.6%
2020.0-2024.9 =	1.3%	2025.0-2029.9 =	1.3%	2030.0-2034.9 =	1.6%	2035.0-2039.9 =	1.6%
2040.0-2044.9 =	1.3%	2045.0-2049.9 =	1.3%	2050.0-205			

C.) OFF-BASE INCINERATOR

1) 96.9% OF ALL INSTALLATIONS DO NOT USE THIS TYPE DISPOSAL

FOR THOSE INSTALLATIONS THAT HAVE SUCH DISPOSAL:

2) THE COST FOR THOSE THAT DON'T USE TRANSFER STATIONS IS AS FOLLOWS:

0.00-	4.99	=	0.0%
4.00-	8.99	=	0.0%
8.00-	12.99	=	0.0%
12.00-	16.99	=	0.0%
16.00-	20.99	=	0.0%
20.00-	24.99	=	0.0%
24.00-	28.99	=	0.0%
28.00-	32.99	=	0.0%
32.00-	36.99	=	0.0%
36.00-	40.99	=	0.0%
40.00-	44.99	=	0.0%
44.00-	48.99	=	0.0%
48.00-	52.99	=	0.0%
52.00-	56.99	=	0.0%
56.00-	60.99	=	0.0%
60.00-	64.99	=	0.0%
64.00-	68.99	=	0.0%
68.00-	72.99	=	0.0%
72.00-	76.99	=	0.0%
76.00-	80.99	=	0.0%
80.00-	84.99	=	0.0%
84.00-	88.99	=	0.0%
88.00-	92.99	=	0.0%
92.00-	96.99	=	0.0%
96.00-	100.99	=	0.0%
100.00-	104.99	=	0.0%
104.00-	108.99	=	0.0%
108.00-	112.99	=	0.0%
112.00-	116.99	=	0.0%
116.00-	120.99	=	0.0%
120.00-	124.99	=	0.0%
124.00-	128.99	=	0.0%
128.00-	132.99	=	0.0%
132.00-	136.99	=	0.0%
136.00-	140.99	=	0.0%
140.00-	144.99	=	0.0%
144.00-	148.99	=	0.0%
148.00-	152.99	=	0.0%
152.00-	156.99	=	0.0%
156.00-	160.99	=	0.0%
160.00-	164.99	=	0.0%
164.00-	168.99	=	0.0%
168.00-	172.99	=	0.0%
172.00-	176.99	=	0.0%
176.00-	180.99	=	0.0%
180.00-	184.99	=	0.0%
184.00-	188.99	=	0.0%
188.00-	192.99	=	0.0%
192.00-	196.99	=	0.0%
196.00-	200.99	=	0.0%
200.00-	204.99	=	0.0%
204.00-	208.99	=	0.0%
208.00-	212.99	=	0.0%
212.00-	216.99	=	0.0%
216.00-	220.99	=	0.0%
220.00-	224.99	=	0.0%
224.00-	228.99	=	0.0%
228.00-	232.99	=	0.0%
232.00-	236.99	=	0.0%
236.00-	240.99	=	0.0%
240.00-	244.99	=	0.0%
244.00-	248.99	=	0.0%
248.00-	252.99	=	0.0%
252.00-	256.99	=	0.0%
256.00-	260.99	=	0.0%
260.00-	264.99	=	0.0%
264.00-	268.99	=	0.0%
268.00-	272.99	=	0.0%
272.00-	276.99	=	0.0%
276.00-	280.99	=	0.0%
280.00-	284.99	=	0.0%
284.00-	288.99	=	0.0%
288.00-	292.99	=	0.0%
292.00-	296.99	=	0.0%
296.00-	300.99	=	0.0%
300.00-	304.99	=	0.0%
304.00-	308.99	=	0.0%
308.00-	312.99	=	0.0%
312.00-	316.99	=	0.0%
316.00-	320.99	=	0.0%
320.00-	324.99	=	0.0%
324.00-	328.99	=	0.0%
328.00-	332.99	=	0.0%
332.00-	336.99	=	0.0%
336.00-	340.99	=	0.0%
340.00-	344.99	=	0.0%
344.00-	348.99	=	0.0%
348.00-	352.99	=	0.0%
352.00-	356.99	=	0.0%
356.00-	360.99	=	0.0%
360.00-	364.99	=	0.0%
364.00-	368.99	=	0.0%
368.00-	372.99	=	0.0%
372.00-	376.99	=	0.0%
376.00-	380.99	=	0.0%
380.00-	384.99	=	0.0%
384.00-	388.99	=	0.0%
388.00-	392.99	=	0.0%
392.00-	396.99	=	0.0%
396.00-	400.99	=	0.0%
400.00-	404.99	=	0.0%
404.00-	408.99	=	0.0%
408.00-	412.99	=	0.0%
412.00-	416.99	=	0.0%
416.00-	420.99	=	0.0%
420.00-	424.99	=	0.0%
424.00-	428.99	=	0.0%
428.00-	432.99	=	0.0%
432.00-	436.99	=	0.0%
436.00-	440.99	=	0.0%
440.00-	444.99	=	0.0%
444.00-	448.99	=	0.0%
448.00-	452.99	=	0.0%
452.00-	456.99	=	0.0%
456.00-	460.99	=	0.0%
460.00-	464.99	=	0.0%
464.00-	468.99	=	0.0%
468.00-	472.99	=	0.0%
472.00-	476.99	=	0.0%
476.00-	480.99	=	0.0%
480.00-	484.99	=	0.0%
484.00-	488.99	=	0.0%
488.00-	492.99	=	0.0%
492.00-	496.99	=	0.0%
496.00-	500.99	=	0.0%
500.00-	504.99	=	0.0%
504.00-	508.99	=	0.0%
508.00-	512.99	=	0.0%
512.00-	516.99	=	0.0%
516.00-	520.99	=	0.0%
520.00-	524.99	=	0.0%
524.00-	528.99	=	0.0%
528.00-	532.99	=	0.0%
532.00-	536.99	=	0.0%
536.00-	540.99	=	0.0%
540.00-	544.99	=	0.0%
544.00-	548.99	=	0.0%
548.00-	552.99	=	0.0%
552.00-	556.99	=	0.0%
556.00-	560.99	=	0.0%
560.00-	564.99	=	0.0%
564.00-	568.99	=	0.0%
568.00-	572.99	=	0.0%
572.00-	576.99	=	0.0%
576.00-	580.99	=	0.0%
580.00-	584.99	=	0.0%
584.00-	588.99	=	0.0%
588.00-	592.99	=	0.0%
592.00-	596.99	=	0.0%
596.00-	600.99	=	0.0%
600.00-	604.99	=	0.0%
604.00-	608.99	=	0.0%
608.00-	612.99	=	0.0%
612.00-	616.99	=	0.0%
616.00-	620.99	=	0.0%
620.00-	624.99	=	0.0%
624.00-	628.99	=	0.0%
628.00-	632.99	=	0.0%
632.00-	636.99	=	0.0%
636.00-	640.99	=	0.0%
640.00-	644.99	=	0.0%
644.00-	648.99	=	0.0%
648.00-	652.99	=	0.0%
652.00-	656.99	=	0.0%
656.00-	660.99	=	0.0%
660.00-	664.99	=	0.0%
664.00-	668.99	=	0.0%
668.00-	672.99	=	0.0%
672.00-	676.99	=	0.0%
676.00-	680.99	=	0.0%
680.00-	684.99	=	0.0%
684.00-	688.99	=	0.0%
688.00-	692.99	=	0.0%
692.00-	696.99	=	0.0%
696.00-	700.99	=	0.0%
700.00-	704.99	=	0.0%
704.00-	708.99	=	0.0%
708.00-	712.99	=	0.0%
712.00-	716.99	=	0.0%
716.00-	720.99	=	0.0%
720.00-	724.99	=	0.0%
724.00-	728.99	=	0.0%
728.00-	732.99	=	0.0%
732.00-	736.99	=	0.0%
736.00-	740.99	=	0.0%
740.00-	744.99	=	0.0%
744.00-	748.99	=	0.0%
748.00-	752.99	=	0.0%
752.00-	756.99	=	0.0%
756.00-	760.99	=	0.0%
760.00-	764.99	=	0.0%
764.00-	768.99	=	0.0%
768.00-	772.99	=	0.0%
772.00-	776.99	=	0.0%
776.00-	780.99	=	0.0%
780.00-	784.99	=	0.0%
784.00-	788.99	=	0.0%
788.00-	792.99	=	0.0%
792.00-	796.99	=	0.0%
796.00-	800.99	=	0.0%
800.00-	804.99	=	0.0%
804.00-	808.99	=	0.0%
808.00-	812.99	=	0.0%
812.00-	816.99	=	0.0%
816.00-	820.99	=	0.0%
820.00-	824.99	=	0.0%
824.00-	828.99	=	0.0%
828.00-	832.99	=	0.0%
832.00-	836.99	=	0.0%
836.00-	840.99	=	0.0%
840.00-	844.99	=	0.0%
844.00-	848.99	=	0.0%
848.00-	852.99	=	0.0%
852.00-	856.99	=	0.0%
856.00-	860.99	=	0.0%
860.00-	864.99	=	0.0%
864.00-	868.99	=	0.0%
868.00-	872.99	=	0.0%
872.00-	876.99	=	0.0%
876.00-	880.99	=	0.0%
880.00-	884.99	=	0.0%
884.00-	888.99	=	0.0%
888.00-	892.99	=	0.0%
892.00-	896.99	=	0.0%
896.00-	900.99	=	0.0%
900.00-	904.99	=	0.0%
904.00-	908.99	=	0.0%
908.00-	912.99	=	0.0%
912.00-	916.99	=	0.0%
916.00-	920.99	=	0.0%
920.00-	924.99	=	0.0%
924.00-	928.99	=	0.0%
928.00-	932.99	=	0.0%
932.00-	936.99	=	0.0%
936.00-	940.99	=	0.0%
940.00-	944.99	=	0.0%
944.00-	948.99	=	0.0%
948.00-	952.99	=	0.0%
952.00-	956.99	=	0.0%
956.00-	960.99	=	0.0%
960.00-	964.99	=	0.0%
964.00-	968.99	=	0.0%
968.00-	972.99	=	0.0%
972.00-	976.99	=	0.0%
976.00-	980.99	=	0.0%
980.00-	984.99	=	0.0%
984.00-	988.99	=	0.0%
988.00-	992.99	=	0.0%
992.00-	996.99	=	0.0%
996.00-	1000.99	=	0.0%

3) THE COST FOR THOSE INSTALLATIONS THAT USE ON-BASE TRANSFER STATIONS ARE AS FOLLOWS:

0.00-	4.99	=	0.0%
4.00-	8.99	=	0.0%
8.00-	12.99	=	0.0%
12.00-	16.99	=	0.0%
16.00-	20.99	=	0.0%
20.00-	24.99	=	0.0%
24.00-	28.99	=	0.0%
28.00-	32.99	=	0.0%
32.00-	36.99	=	0.0%
36.00-	40.99	=	0.0%
40.00-	44.99	=	0.0%
44.00-	48.99	=	0.0%
48.00-	52.99	=	0.0%
52.00-	56.99	=	0.0%
56.00-	60.99	=	0.0%
60.00-	64.99	=	0.0%
64.00-	68.99	=	0.0%
68.00-	72.99	=	0.0%
72.00-	76.99	=	0.0%
76.00-	80.99	=	0.0%
80.00-	84.99	=	0.0%
84.00-	88.99	=	0.0%
88.00-	92.99	=	0.0%
92.00-	96.99	=	0.0%
96.00-	100.99	=	0.0%
100.00-	104.99	=	0.0%
104.00-	108.99	=	0.0%
108.00-	112.99	=	0.0%
112.00-	116.99	=	0.0%
116.00-	120.99	=	0.0%
120.00-	124.99	=	0.0%
124.00-	128.99	=	0.0%
128.00-	132.99	=	0.0%
132.00-	136.99	=	0.0%
136.00-	140.99	=	0.0%
140.00-	144.99	=	0.0%
144.00-	148.99	=	0.0%
148.00-	152.99	=	0.0%
152.00-	156.99	=	0.0%
156.00-	160.99	=	0.0%
160.00-	164.99	=	0.0%
164.00-	168.99	=	0.0%
168.00-	172.99	=	0.0%
172.00-	176.99	=	0.0%
176.00-	180.99	=	0.0%
180.00-	184.99	=	0.0%
184.00-	188.99	=	0.0%
188.00-	192.99	=	0.0%
192.00-	196.99	=	0.0%
196.00-	200.99	=	0.0%
200.00-	204.99	=	0.0%
204.00-	208.99	=	0.0%
208.00-	212.99	=	0.0%
212.00-	216.99	=	0.0%
216.00-	220.99	=	0.0%
220.00			

NON-RECYCLING RELATED SOLID WASTE CONTRACT -- MINIMUM PAYMENT/TONNAGE/VOLUME PER MONTH GUARANTEE

A) RESIDENTIAL AREA

1) THOSE WITH CONTRACTS RESPONDED AS FOLLOWS:

A) TONNAGE ONLY	=	2.5%
B) VOLUME ONLY	=	1.7%
C) DOLLAR AMOUNT ONLY	=	50.0%
D) SOME COMBINATION OF TONNAGE/VOLUME/DOLLAR AMOUNT	=	3.3%
E) NO MINIMUM	=	42.5%

2) NO CONTRACTS = 20.6% OF TOTAL BASES

B) COMMERCIAL/INSTITUTIONAL AREA

1) THOSE WITH CONTRACTS RESPONDED AS FOLLOWS:

A) TONNAGE ONLY	=	2.1%
B) VOLUME ONLY	=	1.0%
C) DOLLAR AMOUNT ONLY	=	53.0%
D) SOME COMBINATION OF TONNAGE/VOLUME/DOLLAR AMOUNT	=	5.2%
E) NO MINIMUM	=	38.1%

2) NO CONTRACTS = 39.4% OF TOTAL BASES

- RECYCLING AND FUELS -

ON-BASE CENTRAL STEAM PLANTS

A.) BASIC FUEL USED

- 1) 26.3% OF TOTAL BASES HAVE NO CENTRAL STEAM PLANTS
- 2) THERE ARE 118 STEAM PLANTS RESPONDING AS FOLLOWS:

A) OIL	49.2%	B) COAL	9.3%	C) NAT. GAS	41.5%	D) REF. FUEL (RDF)	0.0%	E) OTHER	0.0%
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THE FOLLOWING BASES USE REFUSE DERIVED FUEL (RDF) AS A BASIC FUEL: NONE.

B.) FUEL THAT CAN BE UTILIZED

- 1) 26.3% OF TOTAL BASES HAVE NO CENTRAL STEAM PLANTS
- 2) THERE ARE 118 STEAM PLANTS RESPONDING AS FOLLOWS:

A) OIL	42.4%	B) COAL	5.9%	C) NATURAL GAS	6.78%	D) REF. DERIV. FUEL (RDF)	0.00%	E) RDF & A.B. OR C.	0.8%
F) OIL & COAL	3.4%	G) OIL & NAT. GAS	39.8%	H) COAL & NAT. GAS	0.85%	I) OIL, COAL & NAT. GAS	0.00%	J) OTHER	0.0%

THE FOLLOWING BASES CAN UTILIZE REFUSE DERIVED FUEL (RDF):

WRIGHT-PATTERSON

TOTAL INSTALLATIONS LISTED = 1

USE OF REFUSE DERIVED FUEL (RDF)

A) THOSE WHO DO NOT HAVE AND ARE NOT PLANNING FOR THE CAPABILITY = 95.6%

B) THOSE WHO DO NOT HAVE AND ARE PLANNING FOR THE CAPABILITY BEYOND FY77 = 2.5% THEY ARE:

POPE KIRTLAND

CHARLESTON AFB

TOTAL INSTALLATIONS LISTED = 4

C) THOSE WHO DO NOT HAVE AND ARE PLANNING FOR THE CAPABILITY IN FY77 = .6% THEY ARE:

DULUTH IAP

TOTAL INSTALLATIONS LISTED = 1

D) THOSE WHO PRESENTLY HAVE THE CAPABILITY

MCCONNELL

WRIGHT-PATTERSON

TOTAL INSTALLATIONS LISTED = 2

USE OF WASTE HEAT RECOVERY INCINERATORS

-- %'S OF TOTAL INSTALLATIONS

- A) THOSE WHO DO NOT HAVE AND ARE NOT PLANNING FOR THE CAPABILITY = 92.5%
- B) THOSE WHO DO NOT HAVE AND ARE PLANNING FOR THE CAPABILITY BEYOND FY77 = 5.6% THEY ARE:
 ANDREWS
 CHARLESTON AFB
 LANGLEY
 RICKENBACKER
 MANCOCK
 CARSWELL
 EOLIN
 SCOTT
- C) THOSE WHO DO NOT HAVE AND ARE PLANNING FOR THE CAPABILITY IN FY77 = 1.3% THEY ARE:
 BARKSDALE
- D) THOSE WHO PRESENTLY HAVE THE CAPABILITY = .6% THEY ARE:
 MCCONNELL
- E) THOSE WHO PRESENTLY HAVE AND ARE PLANNING TO EXPAND THE CAPABILITY = 0.0% THEY ARE: NONE
- TOTAL INSTALLATIONS LISTED = 9
- TOTAL INSTALLATIONS LISTED = 2
- TOTAL INSTALLATIONS LISTED = 1

STANDARD METROPOLITAN STATISTICAL AREA (SMSA)

- A) 59.4% OF THE TOTAL INSTALLATIONS ARE NOT LOCATED IN THIS TYPE AREA
 B) 40.6% OF THE TOTAL INSTALLATIONS ARE LOCATED IN THIS TYPE AREA
 AND ARE LISTED BELOW:

LOCKPORT
 LOCKPORT AFB
 HICKAM
 CHICAGO/O'HARE IAP
 AFA
 BROOKS
 POPE
 CHEYENNE MOUNTAIN
 VANCE
 LONGVIEW AFB
 WATHER
 NORTON
 ST. JAMESCOM
 MCCLELLAN
 NELLIS
 WRIGHT-PATTERSON

HILL VALLEY
 ANDREWS
 WHEELER
 ALMIDEN
 WILLIAMS
 LITTLE ROCK
 MACDILL
 MALSTROM
 GRIFFISS
 CARSWELL
 RICHMOND-GERAUR
 MCCONNELL
 WINGMEAD
 RANDOLPH
 FAIRCHILD

NORTH CHARLESTON
 BENTLEY
 HANCOCK
 HILL
 MCCORD
 DOBBINS
 RICKENBACKER
 BARKSDALE
 MARCH
 KELL
 LOS ANGELES AFB
 CHANDLER
 CHARLESTON AFB
 TINKER
 CHANUTE

MAXWELL AFB
 LANGLEY
 PETERSON FIELD
 ROBINS
 MCURTRE
 KIRTLAND
 SHEPPARD
 ELMENDORF
 OFFUTT
 LACKLAND AFB
 GENE MITCHELL FIELD
 Keesler
 WALTER PITTS. FLD.
 REESE
 DULUTH IAP

TOTAL INSTALLATIONS LISTED = 65

REGION STATUS:

A) IN OPERATIONS =
N.H. SAT. TRACK. STA

A) IN OPERATIONS = 2.5% OF TOTAL INSTALLATIONS RESIDE IN THIS REGION.

VANDENBERG

MALSTROM

4) BEING GUILTY = 1.3% OF TOTAL INSTALLATIONS RESIDE IN THIS REGION.

GEN. MITCHELL FIELD

C) IN PLANNING = 22.5% OF TOTAL INSTALLATIONS RESIDE IN THIS REGION.

[illegible]

D) NO = 55.0% OF TOTAL INSTALLATIONS RESIDE IN THIS REGION.

E) DO NOT KNOW = 18.8% OF TOTAL INSTALLATIONS RESIDE IN THIS REGION.

THEY ARE:

NIAGRA FALLS YAP

TOTAL INSTALLATIONS LISTED = 4

THEY ARE:

TOTAL INSTALLATIONS LISTED = 2

THEY ARE:

DOVER
WHEELER
EGLIN
MACDONALD
GRIFFIN
HOMESTEAD
ELLISWORTH
SCOTT
WRIGHT-PATTERSON

TOTAL INSTALLATIONS LISTED = 36

PLANS OF OR INVOLVEMENT IN A CIVILIAN, LOCAL, OR REGIONAL SOLID WASTE MANAGEMENT SYSTEMS WHICH INCLUDES SOME PHASE OF MATERIALS AND/OR ENERGY RECOVERY

A. 80.0% OF THE TOTAL INSTALLATIONS HAVE NO INVOLVEMENT.

B. 15.6% OF THE TOTAL INSTALLATIONS ARE IN THE PLANNING STAGE. THEY ARE:

DOVER
LANGLEY
FOMMENDORF
NORTON
SCOTT
WRIGHT-PATTERSON
HICKAM
EGLE
GLYNN
LOURY AFB
GEN. MITCHELL FIELD
MCCLELLAN
WHEELER
TINKER AFB
MATHESON
RICHARDS-GEBAUR
L. G. HANSCOM
TINKER

BERGSTROM
BLYTHEVILLE
K. T. SAWYER
KELLY
VANDENBERG

TOTAL INSTALLATIONS LISTED = 25

C. 4.4% OF THE TOTAL INSTALLATIONS ARE ALREADY INVOLVED. THEY ARE:

FT FISHER
BEALE
N.H. SAT. TRACK. STA
DAVIS-MONTHAN

MATHER

TOTAL INSTALLATIONS LISTED = 7

RECYCLING PROGRAMS INVOLVING NON-DOD SURPLUS PROPERTY (I.E. NOT PURCHASED WITH APPROPRIATED FUNDS)
EXCLUDING BASE EXCHANGE & COMMISSARY WASTE:

- A. 75.6% OF THE TOTAL INSTALLATIONS HAVE NO SUCH PROGRAM
- B. 13.1% OF THE TOTAL INSTALLATIONS HAD A PROGRAM WHICH IS NO LONGER ACTIVE
- C. 11.3% OF THE TOTAL INSTALLATIONS HAVE A CURRENTLY ACTIVE PROGRAM. THEY ARE:

ROLLING
ROCKS
LOWRY AFR
DAVIS-MONTHAN
CHAMUTE

GEORGE
DORRINS
RICHARDS-S-GEBAUR
EDWARDS
WRIGHT-PATTERSON

AFA KIRTLAND AFB
KIRTLAND AFB
LACKLAND AFB
NELLIS

HILLSTROM
MALG HANSCOM
FAIRCHILD

TOTAL INSTALLATIONS LISTED = 18

FOR THOSE INSTALLATIONS THAT NEVER HAD RECYCLING PROGRAMS INVOLVING NON-DOD SURPLUS PROPERTY INCLUDING BASE EXCHANGE & COMMISSARY WASTES:

1.) 28.8% REPORTED THAT RECYCLING WAS NEVER CONSIDERED.

2.) FOR THOSE INSTALLATIONS WHO HAVE CONSIDERED, BUT DON'T HAVE A PROGRAM:

A. 54.7% REPORTED COST ANALYSIS SHOWED THAT SUCH A PROGRAM WAS NOT FEASIBLE.
B. 12.9% REPORTED COST ANALYSIS SUPPORTED THE CONCEPT, BUT OTHER FACTORS DENIED IMPLEMENTATION.
C. 33.3% REPORTED COST ANALYSIS WAS NOT ACCOMPLISHED, BUT RECYCLING WAS CONSIDERED.

BASE EXCHANGE & COMMISSARY WASTES

A. 40.6% OF THE TOTAL INSTALLATIONS RECYCLE CARDBOARD ONLY.
B. 5.0% OF THE TOTAL INSTALLATIONS RECYCLE CARDBOARD AND OTHER WASTES.
C. 54.4% OF THE TOTAL INSTALLATIONS DO NOT RECYCLE CARDBOARD.

RECYCLE PROGRAM OPERATION:

(70.6% RESPONDED: DO NOT HAVE SUCH A PROGRAM.)

FOR THOSE THAT HAVE SUCH A PROGRAM:

A) 53.2% RESPONDED: OPERATION IS BY IN-HOUSE ENGINEERING PERSONNEL.

B) 19.1% RESPONDED: OPERATION IS BY CONTRACTOR PERSONNEL.

C) 27.7% RESPONDED: OPERATION IS BY COMBINATION OF BOTH.

RECYCLE PROGRAM OPERATION:

(82.5% RESPONDED: DO NOT HAVE SUCH A PROGRAM.)

FOR THOSE THAT HAVE SUCH A PROGRAM:

A. 25.0% RESPONDED: SUCCESSFUL FROM THE STANDPOINT OF BASE CITIZEN SUPPORT.

B. 28.6% RESPONDED: SUCCESSFUL FROM THE STANDPOINT OF ECONOMICS.

C. 28.6% RESPONDED: SUCCESSFUL FROM THE STANDPOINT OF BOTH.

D. 17.9% RESPONDED: NOT SUCCESSFUL.

GLOSSARY OF RECYCLING PROGRAM FACTORS
AND
SUMMARY OF INSTALLATION RESPONSES

NOTE: THE SUMMATION OF ALL ANSWERS FOR EACH QUESTION IN EACH CATEGORY IS 100% (OR 0% IF NO INSTALLATIONS ANSWERED IN THAT CATEGORY), AND FOR EACH QUES., EXCLUDES THOSE THAT ANSWERED THAT THEY HAVE NO SUCH PROGRAM.

SURVEY QUESTIONS CONSIDERED	INSTALLATION RESPONSES				ONLY DPDO-DOD SURPLUS PROPERTY PROGRAMS
	ACTIVE SUCCESSFUL PROGRAMS	ACTIVE UNSUCCESSFUL PROGRAMS	NON-ACTIVE PROGRAMS		
Q. 61 RECYCLE PROGRAM OPERATION					
A. BY IN-HOUSE ENGINEERING PERSONNEL	5. (33.3%)	3. (60.0%)	12. (35.3%)	1. (50.0%)	
B. BY CONTRACTOR PERSONNEL	3. (40.0%)	1. (40.0%)	2. (23.5%)	2. (50.0%)	
C. BY A COMBINATION OF BOTH	4. (26.7%)	0. (0.0%)	7. (41.2%)	0. (0.0%)	
Q. 63 MFG RECYCLING METHOD					
A. CURBSIDE PICKUP	1. (15.4%)	0. (0.0%)	0. (0.0%)	0. (0.0%)	
B. ON-BASE RECYCLING CENTERS	1. (15.4%)	0. (0.0%)	2. (21.1%)	0. (0.0%)	
C. BOTH A & B	3. (23.1%)	0. (0.0%)	5. (26.3%)	0. (0.0%)	
D. OTHER METHOD: ONLY, OR WITH A & B	3. (23.1%)	2. (50.0%)	6. (31.6%)	4. (100.0%)	
E. THERE IS NO SUCH PROGRAM					
Q. 64 POTENTIAL RECOVERABLE MATERIALS STUDY					
A. ACCOMPLISHED	1. (47.8%)	3. (60.0%)	1. (50.0%)	3. (100.0%)	
B. NOT ACCOMPLISHED				0. (0.0%)	
Q. 65 WASTE MATERIAL MARKET STUDIES ACCOMPLISHED					
A. BY BASE CIVIL ENGINEERING ONLY	2. (20.0%)	0. (0.0%)	6. (24.5%)	0. (0.0%)	
B. BY DSA/DPDO ONLY	2. (20.0%)	1. (33.3%)	3. (44.5%)	1. (33.3%)	
C. BY OTHER THAN A OR B	1. (20.0%)	0. (0.0%)	2. (16.3%)	1. (33.3%)	
D. BY SOME COMBINATION OF THE ABOVE	1. (20.0%)	2. (33.3%)	1. (16.3%)	0. (0.0%)	
E. WAS NOT ACCOMPLISHED					
Q. 66 ASKED ASSISTANCE OF DSA/DPDO IN LOCATING MARKETS					
A. DSA/DPDO INTERESTED AND SUCCESSFUL	9. (31.0%)	0. (0.0%)	4. (22.3%)	2. (25.0%)	
B. DSA/DPDO INTERESTED, BUT UNSUCCESSFUL	2. (7.0%)	3. (60.0%)	1. (5.3%)	1. (25.0%)	
C. DSA/DPDO NOT INTERESTED	0. (0.0%)	0. (0.0%)	4. (22.3%)	2. (25.0%)	
D. DID NOT ASK DSA/DPDO	3. (41.4%)	1. (40.0%)	4. (22.3%)	1. (25.0%)	
Q. 67 RECYCLE PROGRAM PRE-IMPLEMENTATION COST ANALYSIS STUDY					
A. ACCOMPLISHED	10. (55.6%)	2. (50.0%)	12. (57.1%)	2. (50.0%)	
B. NOT ACCOMPLISHED	4. (44.4%)		9. (42.9%)	1. (50.0%)	
Q. 68 RECYCLE PROGRAM WAS IMPLEMENTED, ALTHOUGH COST ANALYSTS SHOWED NOT ECONOMICALLY FEASIBLE BECAUSE:					
A. IT IS FINANCIALLY FEASIBLE	7. (36.8%)	1. (33.3%)	5. (30.3%)	0. (0.0%)	
B. IT PRESENTED A GOOD PUBLIC IMAGE	1. (21.1%)	0. (0.0%)	0. (0.0%)	0. (0.0%)	
C. BOTH A & B	2. (21.1%)	2. (33.3%)	9. (42.9%)	1. (50.0%)	
D. COST ANALYSIS STUDY WAS NOT ACCOMPLISHED	4. (44.4%)	2. (33.3%)	9. (42.9%)	1. (50.0%)	
Q. 69 MARKET CONSTRAINTS ON MATERIAL PREPARATION					
A. IMPEDES SALE	7. (50.0%)	2. (50.0%)	15. (55.6%)	0. (0.0%)	
B. DOES NOT IMPEDE SALE	7. (50.0%)	2. (50.0%)	6. (44.4%)	3. (100.0%)	
Q. 71 B.O.E. MANNING FOR RECYCLING A MISSION					
A. ADEQUATE	4. (44.4%)	1. (40.0%)	1. (44.4%)	1. (50.0%)	
B. NOT ADEQUATE	10. (55.6%)	3. (60.0%)	15. (55.6%)	2. (50.0%)	
Q. 72 TYPE OF B.C.E. MANPOWER SUPPORT FOR RECYCLING					
A. MAINLY PERMANENT PERSONNEL	9. (36.0%)	4. (100.0%)	20. (55.6%)	2. (42.1%)	
B. MAINLY TEMPORARY OVERHIPE	0. (0.0%)	0. (0.0%)	0. (0.0%)	0. (0.0%)	
C. EVEN SPLIT BETWEEN A & B	1. (32.0%)	0. (0.0%)	1. (44.4%)	0. (0.0%)	
D. THERE IS NO B.C.E. SUPPORT	4. (32.0%)	0. (0.0%)	0. (0.0%)	4. (57.1%)	

RECYCLING PROGRAM BREAKDOWN
 RESPONSES OF INSTALLATIONS WITH _____ SUCCESSFUL _____ RECYCLING PROGRAMS

LISTED INSTALLATIONS	SURVEY QUESTIONS CONSIDERED										
	Q. 61	Q. 62	Q. 63	Q. 64	Q. 65	Q. 66	Q. 67	Q. 68	Q. 69	Q. 71	Q. 72
ROLLING	-	C	-	B	-	D	B	-	B	-	A
GEORGE	-	B	-	A	-	D	A	-	A	-	A
AFA	-	H	-	A	-	D	A	-	A	-	D
HILL	-	A	-	A	-	A	A	-	B	-	A
KIRTLAND	-	A	-	A	-	D	B	-	B	-	A
MALSTROM	-	A	-	A	-	A	A	-	A	-	A
RICHARDS-GERAUR	-	C	-	B	-	A	B	-	B	-	A
LACKLAND AFB	-	C	-	A	-	A	A	-	B	-	A
L G HANSCOM	-	H	-	A	-	A	B	-	B	-	D
DAVIS-MONTHAN	-	A	-	A	-	B	A	-	A	-	A
EDWARDS	-	D	-	A	-	A	A	-	A	-	D
FAIRCHILD	-	D	-	A	-	A	A	-	A	-	D
CHANUTE	-	C	-	B	-	B	A	-	B	-	C
WRIGHT-PATTERSON	-	A	-	A	-	A	A	-	A	-	A

RECYCLING PROGRAM BREAKDOWN
 RESPONSES OF INSTALLATIONS WITH UNSUCCESSFUL RECYCLING PROGRAMS

LISTED INSTALLATIONS	SURVEY QUESTIONS CONSIDERED									
	Q. 61	Q. 63	Q. 64	Q. 65	Q. 66	Q. 67	Q. 68	Q. 69	Q. 71	Q. 72
ROBINS	- A	- B	- A	- D	- B	- A	- C	- A	- B	- A
DOBBINS	- A	- B	- B	- E	- D	- B	- D	- B	- A	- A
LOWRY AFB	- B	- E	- A	- D	- B	- A	- A	- A	- B	- A
NELLIS	- A	- E	- A	- B	- B	- B	- D	- B	- B	- A
	-	-	-	-	-	-	-	-	-	-

RESPONSES OF INSTALLATIONS WITH NON-ACTIVE RECYCLING PROGRAMS

LISTED INSTALLATIONS	SURVEY QUESTIONS CONSIDERED										RECYCLING PROGRAM BREAKDOWN	
	Q. 61	Q. 63	Q. 64	Q. 65	Q. 66	Q. 67	Q. 68	Q. 69	Q. 71	Q. 72		
MT LUGUNA	A	D	A	C	D	B	D	B	A	A		
NOVER	A	E	B	E	D	B	D	A	B	A		
PATRICK	A	E	B	B	A	A	A	B	A	A		
HOLLOMAN	C	B	A	B	B	B	D	B	B	A		
PETERSON FIELD	C	B	A	D	B	A	A	A	B	A		
BRONKS	A	E	A	D	B	A	C	A	B	A		
MCGUIRE	C	B	A	D	A	A	A	B	B	A		
POPF	C	D	B	C	D	B	D	B	B	A		
MYRTLE BEACH	A	B	A	A	B	A	C	A	B	A		
SHEPPARD	A	E	B	D	A	B	D	A	B	A		
GRIFFISS	A	D	A	D	A	A	C	A	B	A		
F E WARREN	C	B	B	D	B	A	C	A	B	A		
CARSWELL	A	D	A	A	B	A	A	A	A	C		
MARCH	A	D	A	A	B	A	C	A	A	A		
DYESS	B	B	A	D	B	B	D	A	A	A		
GRAND FORKS	A	B	A	A	B	A	C	A	B	A		
NORTON	C	C	A	D	B	A	A	A	B	A		
VANDENBERG	A	C	B	A	C	B	D	A	B	A		
TINKER	A	B	A	B	B	B	D	A	B	A		
CASTLE	B	E	B	A	D	B	D	A	A	A		
KEESLER AFB	C	E	A	D	B	A	C	B	B	A		

RESPONSES OF INSTALLATIONS WITH DDDO/DDO SURPLUS PROP RECYCLING PROGRAMS ONLY

LISTED INSTALLATIONS	SURVEY QUESTIONS CONSIDERED										
	Q. 61	Q. 63	Q. 64	Q. 65	Q. 66	Q. 67	Q. 68	Q. 69	Q. 71	Q. 72	
CLEAR	D	E	C	F	E	C	E	C	C	D	
SHENYA	D	E	C	F	E	C	E	C	C	D	
KALISPELL	D	E	C	F	E	C	E	C	C	D	
CAMBRIA	D	E	C	F	E	C	E	C	C	D	
CASWELL	D	E	C	F	E	C	E	C	C	D	
FINLAND	D	E	C	F	E	C	E	C	C	D	
FINLEY	D	E	C	F	E	C	E	C	C	D	
ANTIGO	D	E	C	F	E	C	E	C	C	D	
NORTH REND	D	E	C	F	E	C	E	C	C	D	
ST ALBANS	D	E	C	F	E	C	E	C	C	D	
WATERTOWN	D	E	C	F	E	C	E	C	C	D	
MONTAUK	D	E	C	F	E	C	E	C	C	D	
CAMPION AFS	D	E	C	F	E	C	E	C	C	D	
COLD BAY AFS	D	E	C	F	E	C	E	C	C	D	
FORT YUKON	D	E	C	F	E	C	E	C	C	D	
INDIAN MOUNTAIN	D	E	C	F	E	C	E	C	C	D	
KOTZBUE AFS	D	E	C	F	E	C	E	C	C	D	
MURPHY DOME	D	E	C	F	E	C	E	C	C	D	
SPARREVOHN AFS	D	E	C	F	E	C	E	C	C	D	
TATALINA	D	E	C	F	E	C	E	C	C	D	
TIN CITY	D	E	C	F	E	C	E	C	C	D	
ROANOKE RAPIDS	D	E	C	F	E	C	E	C	C	D	
NORTH CHARLESTON	D	E	C	F	E	C	E	C	C	D	
CHARLESTON AFS	D	E	C	F	E	C	E	C	C	D	
CALUMET	D	E	C	F	E	C	E	C	C	D	
CAPE LISBURNE	D	E	C	F	E	C	E	C	C	D	
CAPE NEWENHAM	D	E	C	F	E	C	E	C	C	D	
CAPE ROYANZOF	D	E	C	F	E	C	E	C	C	D	
GILA REND	D	E	C	F	E	C	E	C	C	D	
ALMADEN	D	E	C	F	E	C	E	C	C	D	
MT HERO	D	E	C	F	E	C	E	C	C	D	
WILLIAMS	B	E	A	C	D	A	C	B	A	A	
MCCORD	D	E	C	F	C	C	E	C	C	D	
SEYMOUR-JOHNSON	B	E	A	B	A	B	D	B	C	D	
HURLBURT FIELD	D	E	C	F	B	C	E	C	C	D	
CHEYENNE MOUNTAIN	D	F	C	F	E	C	E	C	C	D	
NEWARK AFS	D	F	C	F	E	C	E	C	C	D	
EIELSON	D	E	C	F	E	C	E	C	C	D	

[illegible]

RESPONSES TO RECYCLING OR MATERIALS SUCH AS
 1. CARDBOARD FROM THE COMMISSARY & BASE EXCHANGE,
 2. ALUMINUM CANS FROM CLUMS, AND
 3. COMPUTER PAPER & CARDS FROM DATA AUTOMATION
 THAT DEPEND ENTIRELY ON BASE RECYCLING PROGRAM.
 (WITHOUT WHICH MATERIALS WOULD BE LANDFILLED.)

(52.4% RESPONDED: DO NOT HAVE SUCH A PROGRAM.)

FOR THOSE THAT HAVE SUCH A PROGRAM:

A: 54.0% ARE ENTIRELY DEPENDENT.
 B: 44.0% ARE NOT ENTIRELY DEPENDENT.

PLANS TO IMPLEMENT RECYCLE PROGRAM FOR FY77

1.) FOR THOSE INSTALLATIONS THAT CURRENTLY HAVE NO PROGRAM:

A: 7.7% DO NOT PLAN TO IMPLEMENT A PROGRAM
 B: 8.5% PLAN TO IMPLEMENT A PROGRAM IN FY77
 C: 78.9% PLAN TO IMPLEMENT A PROGRAM AFTER FY77

PLANS TO IMPLEMENT RECYCLE PROGRAM FOR FY77

2.) FOR THOSE INSTALLATIONS THAT PREVIOUSLY HAD A PROGRAM, THAT IS NOW INACTIVE: (INSTALLATIONS ARE LISTED, IF ANY)

A: 14.3% DO NOT PLAN TO IMPLEMENT A PROGRAM
 B: 2.3% PLAN TO IMPLEMENT A PROGRAM IN FY77

COVER

C: 71.4% PLAN TO IMPLEMENT A PROGRAM AFTER FY77

MT LUNA
 BROWN
 GROSS
 TINKER

DATICK
 BROWN
 CANNELL
 CASTLE

HOLLOMAN
 MYRTLE BEACH
 MARCH
 KEESLER AFB

PETERSON FIELD
 SHEPPARD
 GRAND FORKS

TOTAL INSTALLATIONS LISTED = 1

TOTAL INSTALLATIONS LISTED = 15

TOTAL COST OF JANITORIAL/CUSTODIAL SERVICE (INCLUDING ALL IN-HOUSE AND CONTRACT JANITORIAL SERVICE)

MINIMUM TOTAL COST = \$ 16225000.

PERCENTAGE RESPONSES PER COST CATEGORY
 (COST IS IN THOUSANDS OF DOLLARS)

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EDIT SECTION

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ANSERS TO QUEUES AND PROBLEMS
CONFIDENTIAL
PROGRAM
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SUPPLY
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APPENDIX C

AIR FORCE INSTALLATIONS' SOLID WASTE TONNAGE DATA

<u>INSTALLATION</u>	<u>COUNTY/STATE</u>	<u>SMSA</u>	<u>TOTAL TONS/DAY</u>
<u>Air University</u>			
Maxwell AFB	Montgomery/AL	Montgomery AL	3.7
Gunter AFB	Montgomery/AL	Montgomery AL	1.2
<u>Tactical Air Command:</u>			
Bergstrom AFB	Travis/TX	Austin TX	14.0
Cannon AFB	Curry/NM	None	11.9
England AFB	Rapides/LA	None	10.9
Davis Monthan AFB	Pima/AZ	Tucson AZ	15.7
George AFB	San Bernardino/CA	Riverside-San Bernardino Ontario CA	17.4
Holloman AFB	Otero/NM	None	17.9
Hurlburt Field AFB	Okaloosa/FL	None	10.4
Homestead AFB	Dade/FL	Miami FL	20.9
Langley AFB	Hampton/VA	Newport News-Hampton VA	11.6
Luke AFB	Maricopa/AZ	Phoenix AZ	13.4
MacDill AFB	Hillsborough/FL	Tampa - St Petersburg FL	20.3
Moody AFB	Lowndes/GA	None	9.4
Mt Home AFB	Elmore/ID	None	18.2
Myrtle Beach AFB	Horry/SC	None	6.2
Nellis AFB	Clark/NV	Las Vegas NV	20.6
Seymour Johnson AFB	Wayne/NC	None	19.8
Shaw AFB	Sumpter/SC	None	16.2
<u>Security Service:</u>			
Goodfellow AFB	Tom Green/TX	San Angelo TX	5.7
<u>Reserve:</u>			
Minneapolis-St Paul (AFRES)	Hennepin/MN	Minneapolis-St Paul MN	2.2
Westover AFB	Hampden/MA	Springfield-Chicopee Holyoke MA	2.3
Chicago O'Hare IAP	Cook/IL	Chicago IL	4.1
<u>AF Academy</u>			
Air Force Academy	El Paso/CO	Colorado Springs CO	21.0
<u>Strategic Air Command:</u>			
Andersen AFB	Guam	None	23.6
Barksdale AFB	Bossier/LA	Shreveport LA	18.1
Beale AFB	Yuba/CA	None	25.9
Blytheville AFB	Mississippi/AR	None	8.8
Carswell AFB	Tarrant/TX	Dallas-Ft Worth TX	14.0
Castle AFB	Merced/CA	None	17.8
Dyess AFB	Taylor/TX	Abilene TX	13.0

<u>INSTALLATION</u>	<u>COUNTY/STATE</u>	<u>SMSA</u>	<u>TOTAL TONS/DAY</u>
Ellsworth AFB	Pennington/SD	None	21.0
Fairchild AFB	Spokane/WA	Spokane, WA	22.8
F. E. Warren AFB	Laramie/WY	None	16.1
Grand Forks AFB	Grand Forks/ND	None	21.2
Griffiss AFB	Oneida/NY	Utica-Rome, NY	19.1
Grissom AFB	Miami/IN	None	14.5
Kincheloe AFB	Chippewa/MI	None	14.6
K. I. Sawyer	Marquette/MI	None	15.2
Loring AFB	Aroostook/ME	None	20.9
Malmstrom AFB	Cascade/MT	Great Falls, MT	15.8
March AFB	Riverside/CA	Riverside-San Bernardino- Ontario, CA	13.4
McConnell AFB	Sedwick/KS	Wichita, KS	18.6
Offutt AFB	Sarpy/NE	Omaha, NE	27.1
Pease AFB	Rockingham/NH	Boston, MA	14.0
Plattsburg AFB	Clinton/NY	None	18.9
Rickenbacker AFB	Franklin/OH	Columbus, OH	19.2
Vandenberg AFB	Santa Barbara/CA	Santa Barbara, CA	26.8
Whiteman AFB	Johnson/MO	None	10.8
Wurtsmith AFB	Isco/MI	None	16.0
Minot AFB	Maro/SD	None	23.2

Air Defense Command:

Cambria AFS	San Luis Obispo/CA	None	1.0
Clear Mews	4th PCT/AK	None	6.7
Duluth AFB	St Louis/MN	Duluth-Superior, MN	3.3
Hancock AFB	Onodago/NY	Syracuse, NY	1.4
Kingsley Field	Klamath/OR	None	2.0
Lockport AFS	Niagara/NY	Rochester, NY	1.4
Makah AFS	Slallam/WA	None	1.0
Peterson AFB	El Paso CO	Colorado Springs, CO	48.2
N. Truro AFS	Barnstable/MA	None	1.0
Tyndall AFB	Bay/FL	None	42.4

AF Communications Service:

Richards-Gebaur AFB	Jackson-Cass/MO	Kansas City, MO	10.3
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AF Logistics Command:

Hill AFB	Davis-Weber/UT	Salt Lake City, UT	39.6
Kelly AFB	Bexar/TX	San Antonio, TX	44.2
McClellan AFB	Sacramento/CA	Sacramento, CA	36.2
Robins AFB	Houston/GA	Macon, GA	49.3
Tinker AFB	Oklahoma/OK	Oklahoma City, OK	40.0
Wright-Patterson AFB	Greene-Montgomery/OH	Dayton, OH	45.0
Newark AFS	Licking/OH	None	3.0

<u>INSTALLATION</u>	<u>COUNTY/STATE</u>	<u>SMSA</u>	<u>TOTAL TONS/DAY</u>
<u>Alaskan Air Command:</u>			
Eielson AFB	Fairbanks/AK	None	15.5
Elmendorf AFB	Anchorage/AK	Anchorage, AK	52.4
<u>Military Airlift Command:</u>			
Charleston AFB	Charleston/SC	Charleston-North Charleston, SC	17.4
Little Rock AFB	Pulaski/AR	Little Rock, AR	14.1
Norton AFB	San Bernardino/CA	Riverside-San Bernardino- Ontario, CA	14.4
Travis AFB	Solano/CA	Vallejo-Fairfield- Napa, CA	24.7
Altus AFB	Jackson/OK	None	7.5
Scott AFB	St Clair/IL	St Louis, IL	18.3
Andrews AFB	Prince George/MD	Washington, MD	57.0
Bolling	District of Colum- bia/DC	Washington DC	26.3
Dover	Kent/DE	None	12.0
McGuire	Burlington/NJ	Philadelphia, PA	33.5
McChord AFB	Pierce/WA	Tacoma WA	17.1
Pope AFB	Cumberland/NC	Fayetteville NC	8.5
<u>Air Training Command:</u>			
Chanute AFB	Champaign/IL	Champaign-Urbana- Rantol, IL	30.5
Columbus AFB	Lowndes/MS	None	5.3
Craig AFB	Dallas/AS	None	6.4
Keesler AFB	Harrison/MS	Biloxi-Gulf Port, MS	23.0
Lackland AFB	Bexar/TX	San Antonio TX	30.2
Laughlin AFB	Valverde/TX	None	4.7
Lowry AFB	Denver/CO	Denver-Boulder, CO	13.7
Mather AFB	Sacramento/CA	Sacramento, CA	10.7
Randolph AFB	Bexar/TX	San Antonio, TX	12.4
Reese AFB	Lubbock/TX	Lubbock, TX	6.3
Sheppard AFB	Wichita/TX	Wichita Falls TX	17.2
Vance AFB	Garfield/OK	None	1.8
Webb AFB	Howard/TX	None	4.3
Williams AFB	Maricopa/AZ	Phoenix AZ	9.5
<u>AF Systems Command:</u>			
Arnold AFS	Coffee/TX	None	5.9
Brooks AFB	Bexar/TX	San Antonio, TX	2.8
Cape Canaveral AFS	Brevard/FL	Melbourne-Titusville- Cocoa, FL	7.4
Edwards AFB	Kern/CA	Bakersfield, CA	17.8

<u>INSTALLATION</u>	<u>COUNTY/STATE</u>	<u>SMSA</u>	<u>TOTAL TONS/DAY</u>
Eglin AFB	Okaloosa/FL	None	24.5
L G Hanscom AFB	Middlesex/MA	Boston, MA	11.6
Kirtland AFB	Bernalillo/NM	Albuquerque, NM	40.0
Los Angeles AFB	Los Angeles/CA	Los Angeles, CA	17.9
Patrick AFB	Brevard/FL	Melbourne-Titusville- Cocoa FL	4.5
Sunnyvale AFB	Santa Clara/CA	San Jose, CA	2.5

Pacific Air Forces:

Hickam AFB	Honolulu/HI	Honolulu, HI	91.6
Wheeler AFB	Honolulu/HI	Honolulu, HI	20.8
Bellows AFS	Honolulu/HI	Honolulu, HI	3.8

National Guard:

Ellington AFB	Harris/TX	Houston, TX	2.2
Selfridge ANG	Macomb/MI	Detroit, MI	3.2
Otis AFB	Barnstable/MA	None	2.0
McEntire ANG	Richland/SC	Columbia SC	1.5
Volk Field ANG	Juneau/WI	None	1.8

APPENDIX D

BIRD STRIKES AND GARBAGE

Capt Mike Harrison
AFCEC/DEVN

Had there been a garbage dump or sanitary landfill at Kitty Hawk where Orville and Wilbur Wright took their first flight in 1903, the course of aviation history may well have been changed. Those of us who frequent dumps and landfills recognize that they attract birds, but few operators and engineers realize that these same birds which feed on garbage also hit airplanes. The first recorded fatal encounter between an airplane and a bird in the United States occurred in San Diego in 1912, when Cal Rodgers, an aviator of some renown, hit a gull, killing the bird and himself.

During the early years of aviation history, we were not plagued with severe bird strike problems. However, the coming of the jet age, and the greater speed and problems with engine ingestions, resulted in a sudden increase in damage and loss of aircraft and lives. In the Air Force, nine aircrew members and 18 aircraft have been lost due to bird strikes over the last 11 years. Dollar losses since 1966 have exceeded 85 million dollars, not including labor costs for repairs. Worldwide, annual losses due to bird strikes may well exceed one billion dollars, based on estimates provided by the Civil Aviation Authority of the United Kingdom (Thorpe, 1976).

How important is garbage, and what role does a dump or landfill play in the bird strike problem? Garbage attracts large numbers of birds which are potentially hazardous to aircraft. These birds will scavenge for food and use the open areas of the garbage disposal site for resting areas between feedings. Omnivorous birds such as gulls are especially attracted to refuse collection sites. These large birds are often found soaring over the refuse sites between feedings, increasing the risk of bird strikes. Other birds which are frequently found feeding on garbage include crows, starlings, grackles and several species of blackbirds.

Dumps and landfills have been the indirect cause of several major accidents involving bird strikes. A crash of an Eastern Airlines Lockheed Electra in 1960 killed 62 people while trying to land at Logan International Airport. The aircraft ingested birds which frequently fed at a landfill near the airport, lost power and crashed (Thorpe, 1973). A Learjet crashed in 1973, killing eight people at Peachtree-DeKalb Airport near Atlanta GA. In this accident, brown-headed cowbirds, flying from a landfill on the airfield were blamed for the accident (NTSB, 1973).

A bird strike occurred on 12 November 1975 at J. F. Kennedy Airport, New York, when an Overseas National DC-10 was totally destroyed on takeoff. The New York Port Authority operates two large landfill operations near the airport. One landfill, the Dunsmere site, attracts large numbers of gulls which, after feeding, fly to the airport and loaf on the runways, taxiways and on the grass adjacent to the runways. On takeoff the DC-10 ingested gulls into its number three engine, the engine disintegrated and the aircraft caught fire. The takeoff was aborted, and the aircraft was totally destroyed. Thirteen dead gulls were found on the runway. The cost of the accident will exceed \$25 million (NTSB, 1976).

The problem of refuse collection sites, birds and bird strikes is one of proximity to the airport. Historically, landfills and dumps have been located near airports because airports were located away from the community and usually had good roads connecting the community with the airport. The land around the airport was owned by the community, so remoteness, good access and land ownership logically dictated that the community refuse site be located on or near the airport. The same logic has been used on military airfields. Landfills are traditionally located on perimeter roads on the opposite side of the runway from the main base, often very close to the runway.

When refuse sites are located close to runways, the risk from bird strikes increases sharply. In 1971, the Environmental Protection Agency surveyed 32 airfields with serious bird strike problems and 105 refuse sites near these airports. Seventy-three percent of the landfills surveyed could be classified as open dumps and were operated improperly. In every case where the landfills or dumps were closed, a significant decrease in bird strikes was noted (Davidson, 1971). At most disposal sites, improper refuse disposal operations and lack of awareness of the bird/aircraft hazard were noted.

Awareness of the problem by state and local officials and sanitary engineers is necessary. Without an understanding of the bird strike hazard, considerable difficulties are encountered when a disposal site must be closed or modified to reduce the risk from bird strikes. Locating new disposal sites creates similar problems unless engineers are aware that their planning may result in an air tragedy. How close to an airport should a landfill be located, and what parameters must be considered when selecting a site? These questions, in many cases, can only be answered by a competent biologist who is familiar with the birds and the bird strike problem.

However, guidelines do exist which can assist in locating a new land disposal site or in identifying the need to phase out and close an existing site. The International Civil Aviation Organization (ICAO) identified the following criterion:

"Garbage disposal dumps should not be located within 13 km (8 miles) of the airport reference point." (ICAO, 1975)

The Federal Aviation Administration (FAA) has published Order 5200.5 which states:

". . . all landfills within 10,000 feet of any runway used or planned to be used by a turbojet aircraft, or within 5,000 feet by piston type aircraft, to be incompatible with airport operations, and therefore must be closed or prohibited." (FAA, 1974).

The Environmental Protection Agency (EPA) provides for a broad interpretation requiring identification of the hazards:

"The site should not be located in an area where the attraction of birds would pose a hazard to low-flying aircraft." (EPA, 1974)

In a 7 Feb 75 letter from the Office of Solid Waste Management Programs (EPA/OSWMP) the EPA clarified their position in support of the FAA Order:

"1. In cases where disposal operations are in existence and do not meet EPA/OSWMP standards. . . OSWMP will support FAA in closing down of those operations. Conversely, in cases where disposal operations do meet OSWMP guidelines and scrutiny, OSWMP will support continuance of operations that minimize bird attractions and recommend to the FAA that a waiver be granted.

2. In cases where disposal operations are only in the planning stage and no commitments of resources have yet been made, OSWMP is inclined to support the FAA position, and will advise that all potential problems be avoided and that other disposal sites outside of the 10,000 and 5,000 feet area be found.

3. However, in cases where disposal operations are in a planning or site-acquisition phase and where some irretrievable investment has already been made, OSWMP will examine every aspect of the proposed operations and make a determination as to whether or not it will support the continuance of the planning and recommend to the FAA that a waiver be granted." (EPA, 1975)

These policy statements can assist in reducing the bird/aircraft strike hazard caused by waste disposal operations. If the solid waste manager is aware of the potential problems when garbage, birds and airplanes are brought together in close proximity, he can use effective planning and management.

The solid waste manager, engineer or regulatory agency can assist in reducing the risk of bird strikes by utilizing the following guidelines:

1. Insure that strict standards for land disposal of waste are enforced.

2. Monitor contract operations to insure compliance with contract requirements for waste disposal.

3. Where landfills are creating a definite bird strike hazard, examine alternate locations or means of solid waste disposal, working toward closing the landfill as soon as possible.

4. Consider bird strike hazards in reviewing existing and new operations prior to expansion or new site selection.

5. Increase operator awareness of the bird strike hazard to insure effective and efficient operation of the landfill.

6. Develop necessary plans for immediate closure of a site, should a serious risk develop, or plan for initiation of an interim bird control program.

Remember that garbage, birds and airplanes combine to form a potentially disastrous situation. Adequate planning and solid waste management by design and supervisory personnel can insure that this risk is minimized when disposal sites are located near airfields.

APPENDIX E

STANDARD METROPOLITAN STATISTICAL AREA (SMSA)

- A) 59.4% OF THE TOTAL INSTALLATIONS ARE NOT LOCATED IN THIS TYPE AREA
 B) 40.6% OF THE TOTAL INSTALLATIONS ARE LOCATED IN THIS TYPE AREA

MAXWELL AFB
 TRAVIS
 LANGLEY
 PETERSON FIELD
 ROBINSON
 MCGUIRE
 KIRTLAND
 SHEPHERD
 EMMENDORF
 OFFUTT
 LACKLAND AFB
 GEN. MITCHELL FIELD
 LUKF
 GREATER PITTS. FLD.
 REESE
 DULUTH IAP
 LOCKPORT

GUNTER AFB
 HICKAM
 CHICAGO/O'HARE IAP
 AFA
 BROOKS
 POPE
 CHEYENNE MOUNTAIN
 VANCE
 LOWRY AFB
 MATHER
 NORTON
 L G HANSCOM
 SCOTT
 MCCLELLAN
 NELLIS
 WRIGHT-PATTERSON
 MILL VALLEY

ANDREWS
 WHEELER
 ALMADEN
 WILLIAMS
 LITTLE ROCK
 MACDILL
 MALDEN
 GRIFFISS
 CARSWELL
 RICHMOND-GEBAR
 MCCONNELL
 VANDENBERG
 NIAGRA FALLS IAP
 RANDOLPH
 FAIRCHILD

BOLLING
 BERGSTROM
 HANCOCK
 HILL
 MCCHORD
 DOBBINS
 RICKENBACKER
 BARKSDALE
 MARCH
 KELLY
 LOS ANGELES AFS
 YOUNGSTOWN MPT
 CHARLESTON AFB
 TINKER
 CHANUTE

TOTAL INSTALLATIONS LISTED = 65

INSTALLATIONS IN STANDARD METROPOLITAN STATISTICAL AREAS (SMSAs)

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3245ABG/DE	1	78FTG/DE	1
314CSG/DE	1	439CSG/DE	1
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3902ABW/DE	1		
102FIW/DE	1		
6550ABG/DE	1		
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